

This Week in The Iron Age

AUGUST 8, 1940

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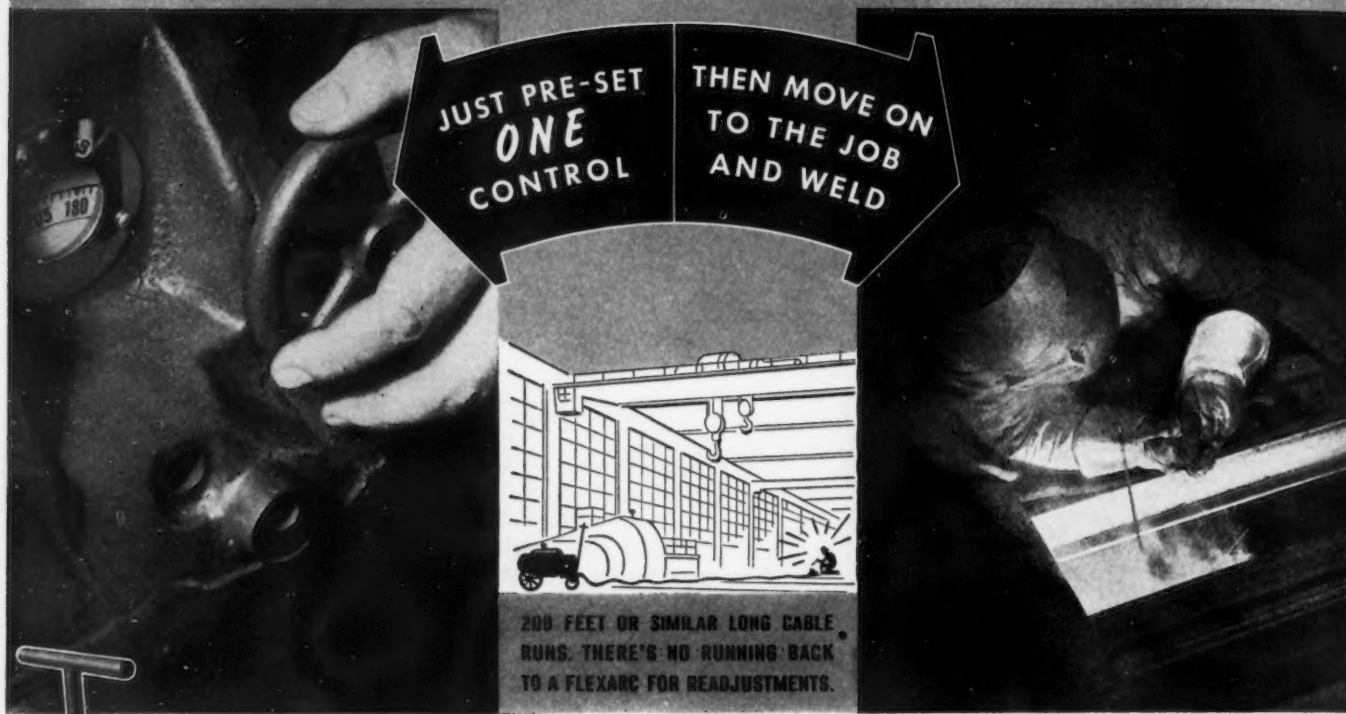
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The Iron Age

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AUGUST 8, 1940

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ESTABLISHED
1855



A One-Man Country?

WHILE on Cape Cod last Thursday, I happened to pick up *The Iron Age* at a marine engine repair plant. Even on vacation a "shoemaker sticks to his last" and a bussman rides the busses, it seems. So it is legitimate for an editor to read his paper under such circumstances.

I noted the editorial in that issue and appreciate the kindly thought of the president of *The Iron Age* in attempting to bat for the editor during his absence. I also noticed that he threatened, or rather I should say promised, to write another editorial this week while the editor was completing his vacation.

Such kindly intent must surely deserve appreciation and I hereby tender my thanks. But I cannot permit our president to sacrifice himself, not to speak of our readers. When a man needs a dictionary and large type to fill the scanty space left for a message on this page with one syllable words, it is surely evidence of great travail of mind and strain of intellect. And our worthy president needs to conserve what he has.

So the editor is interrupting his vacation among the black flies and mosquitoes to carry on. And I will carry on from where our president left off last week.

He said that *The Iron Age* for once, at least, should agree with President Roosevelt. And that since the President has stated that his dearest wish has been to retire to private life, we should do everything in our power to help him attain his desire.

I suppose it is natural for a president to think in terms of giving other presidents what they want. But an editor doesn't think that way. He thinks in terms of giving people what they need, regardless of presidents, capitalized or otherwise. And conversely, of keeping people from getting what will be bad for them.

Looking at it from this angle, I believe that the worst thing that could happen to us in this year of unfortunate happenings would be the upsetting of the third term tradition. And I would say the same thing if a Republican, a bona fide Democrat, or a Prohibitionist were running for a third term.

Upsetting this precedent would be bad enough in ordinary times. But it would be infinitely worse in these days when populations are succumbing to one-man rule.

True, the President has evinced his belief that there is no other Democrat capable of running the United States and, of course, his opinion includes Willkie too. But Mr. Hitler thinks the same thing about Fuehrer Hitler, Mr. Mussolini about Il Duce Mussolini, and Mr. Stalin about Comrade Stalin. That is the outstanding symptom of dictatorship — the superiority complex.

We are now doing most of the things that have been foreign to our ideas and ideals as Americans. We are arming to the teeth; we are raising a huge army by conscription in time of peace, and we are preparing to tax future generations into the poor house. Perhaps that is necessary, but a third term is not. And defeating the third term, one-man idea, is the only out we have left to prevent us from becoming totalitarians and to restore our liberties after the war is over.

J. W. Van Hook

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Centrifugal Casting

—The Process, Its Limitations and Advantages

“LIQUID forging” is an apt synonym for centrifugal casting, the foundry process which is the only radical change in the casting of metals since pressure die casting was introduced. Reduced to its simplest definition, centrifugal casting may be described as the casting of metal under pressure of the centrifugal force developed through high rotative speeds of a specially prepared mold.

The centrifugal casting process is not new; it was conceived about 1850 but was not commercially applied until after 1900. However, because of the special equipment required and the difficulties attendant to the process, it was not widely used for bronze and alloy steel until recently. Within the last three years, the number of firms capable of casting centrifugally has quadrupled, partly because of the competitive situation within the foundry industry, but mainly because of

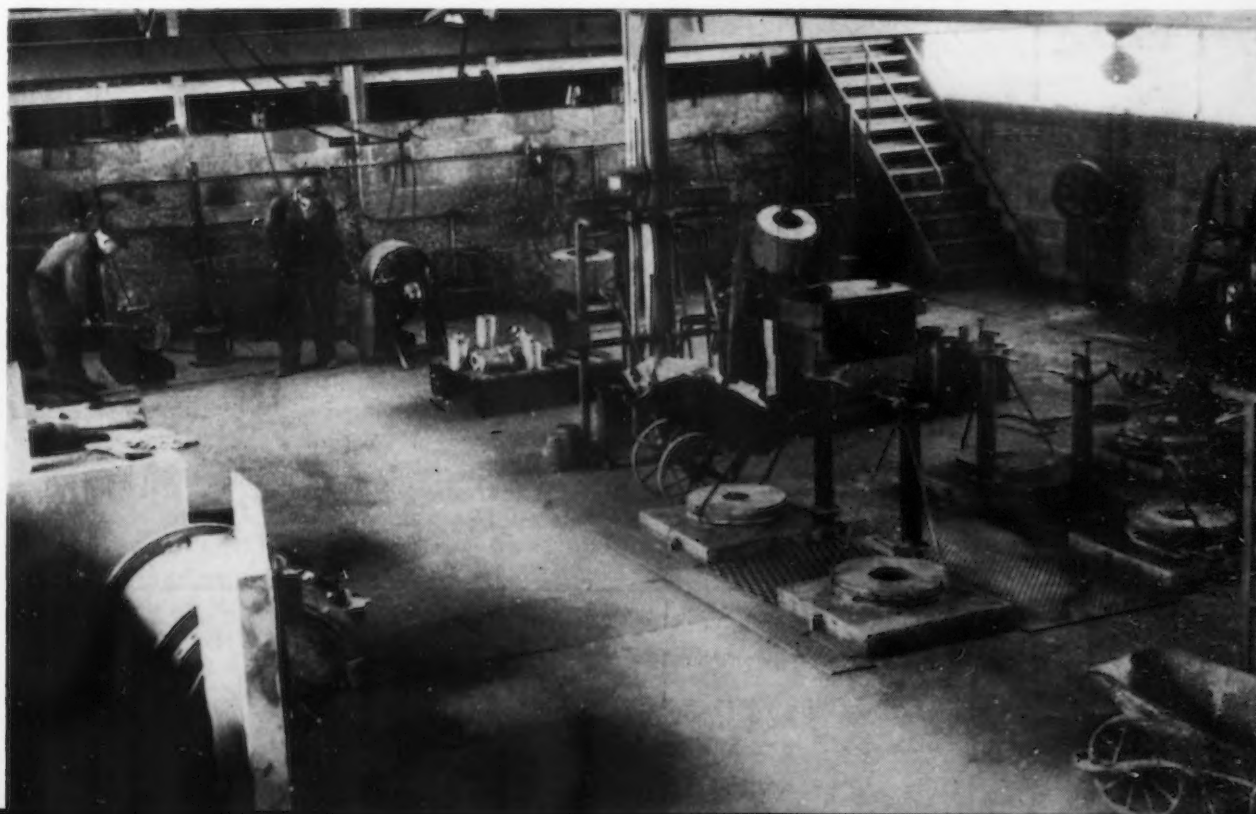
industrial acceptance of and demand for metals so cast.

Process Basically Simple

Unfortunately, it is not possible to outline a given set of conditions or a given procedure as a basis for the

centrifugal casting of all metals. Therefore, this article must of necessity be confined to a somewhat general description of the process and the benefits to be derived therefrom. Practice will necessarily vary, dependent upon the metal being cast, the size of

FIG. 1—A general view of the Ampco Metal, Inc., centrifugal casting division, showing four of the small casting spindles as well as part of the melting equipment used in this division.



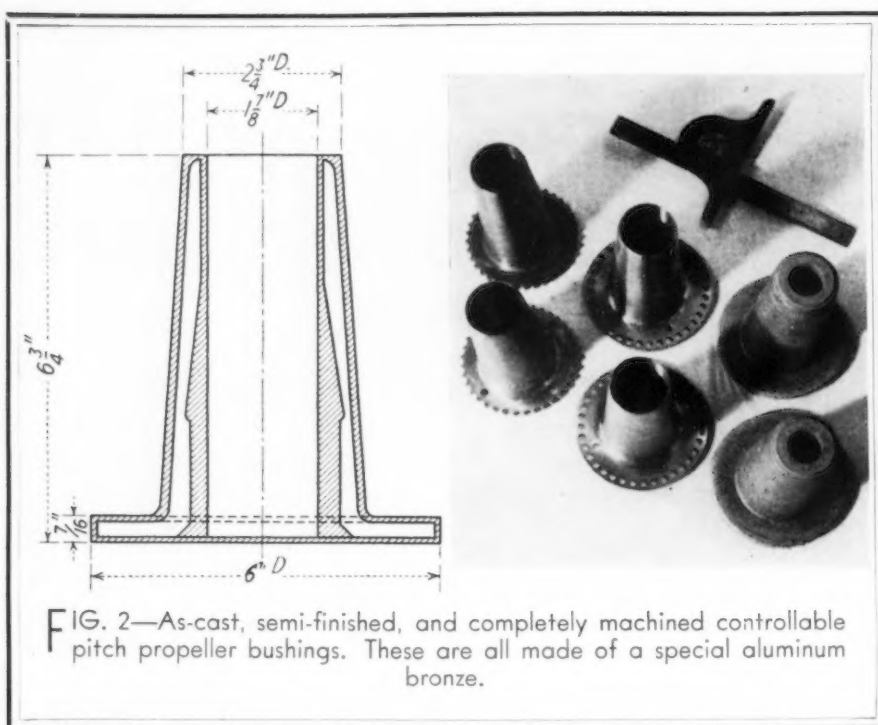


FIG. 2—As-cast, semi-finished, and completely machined controllably pitch propeller bushings. These are all made of a special aluminum bronze.

the casting, and special features of the work at hand. First, as to process:

The basic requirement is for mechanical equipment capable of wide speed variation (from 50 to 3000 r.p.m. if a variety of work is to be done), to which can be affixed a mold or die for use in actual production. Mechanical drives are usually used, although most of the machines at Ampco (see Fig. 1) are hydraulically powered. A hydraulic drive was chosen for several reasons, among which were infinite speed variation, convenience of remote control of centrifugal spindles, and the cushioning effect of hydraulic power against shocks, together with the elimination of high-speed gearing requirements. One drive pump takes care of five spindles or centrifugal machines, and the hook-up is so made that from one to five machines can be operated simultaneously, at the same or differing speeds. This hydraulic drive system, which has been in constant use for over 18 months to date, has proved entirely satisfactory.

Mold equipment varies widely, dependent upon the design or construction of basic equipment, and the type of castings being produced. Most common is a steel or iron shell, dynamically balanced, with suitable fixtures for attachment to the driving unit. The mold, usually of core sand composition or a variation thereof, is rammed up in this liner and the whole unit baked in a core oven. In some cases, the shell is used as a housing

or retainer only, and the liner baked in a separate shell, liner and shell then being slipped into the retainer for casting.

A mold such as this is suitable for the production of only one casting, as the sand liner is broken up in

removal of the casting. For high production runs, steel or iron molds are used, the inside contour of which is machined to the desired outside contour of the castings to be made. Compositions of such molds will vary, many of them being inexpensively made of alloy cast irons of the type usually used for billet mold production. Production equipment of this type can be used for from 30 to 80 castings before redressing is necessary. After a certain number of pieces have been made, redressing is necessary, for heat cracks will have appeared in the mold, or its surface will have been roughened or abraded, making casting removal difficult, and the castings themselves unsightly.

Castings produced by the baked sand liner method require little, if any, taper from one end to the other, since the mold is destroyed in the shakeout. With metal or permanent dies, a slight taper on the order of $\frac{1}{8}$ -in. per ft. on the diameter is employed, so that the casting quickly frees itself for removal and does not wear the mold surface unduly.

Pouring and Rotating

Regardless of the type of mold used, a cover is placed over the end from which the liner is inserted or rammed up. Pouring of the metal may be handled in several ways, the most

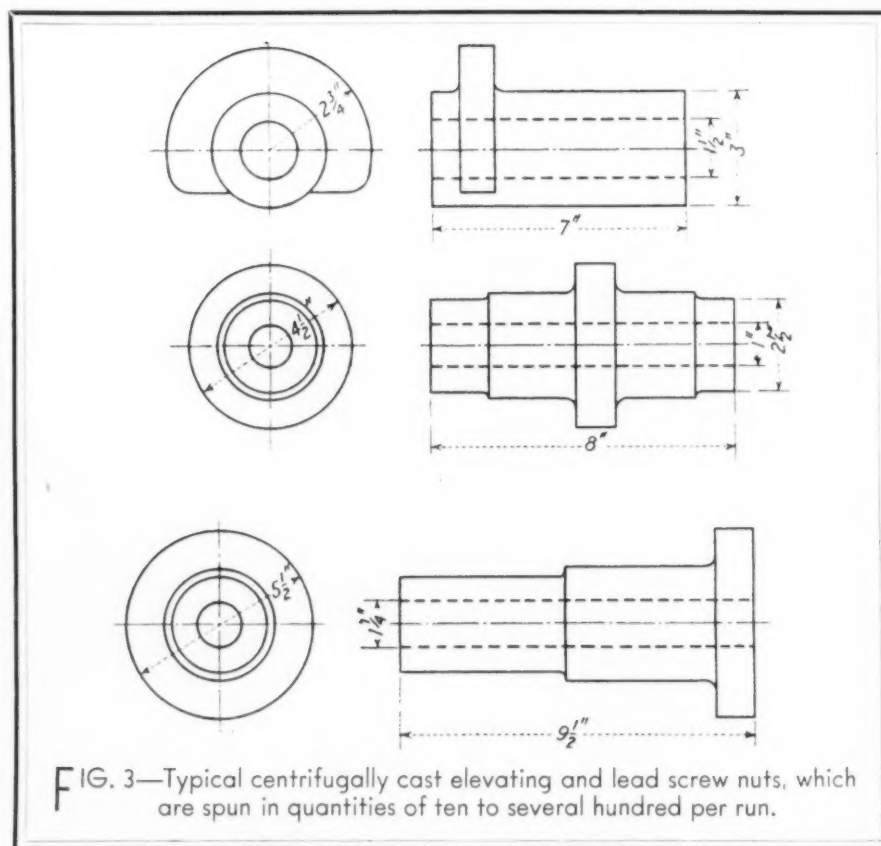


FIG. 3—Typical centrifugally cast elevating and lead screw nuts, which are spun in quantities of ten to several hundred per run.

common of which is pouring directly into the mold through a hole in this cover plate, which procedure is usually wholly satisfactory for comparatively short pieces. In the making of long thin-walled castings, this same procedure is sometimes followed, but usually only when the mold is inclined rather than fully horizontal. Other methods are used in some plants

only enough to hold the metal against the mold wall. At the other end of the scale, it may be reasoned that the higher the speed of rotation, the greater will be the compacting and cleaning action due to centrifugal force. The factors of cooling, shrinkage, hot metal strength, and liability of segregation of metal ingredients must all be considered in establishing

propeller bushing. Fig. 2, of which some 40,000 have been produced to date. Fig. 3 illustrates typical elevating and lead screw nuts now being spun in quantities of from ten to several hundred per run, in special dies. Fig. 4 shows representative gear blanks produced in the same manner. As an example of the range of work being done, the weight of parts being

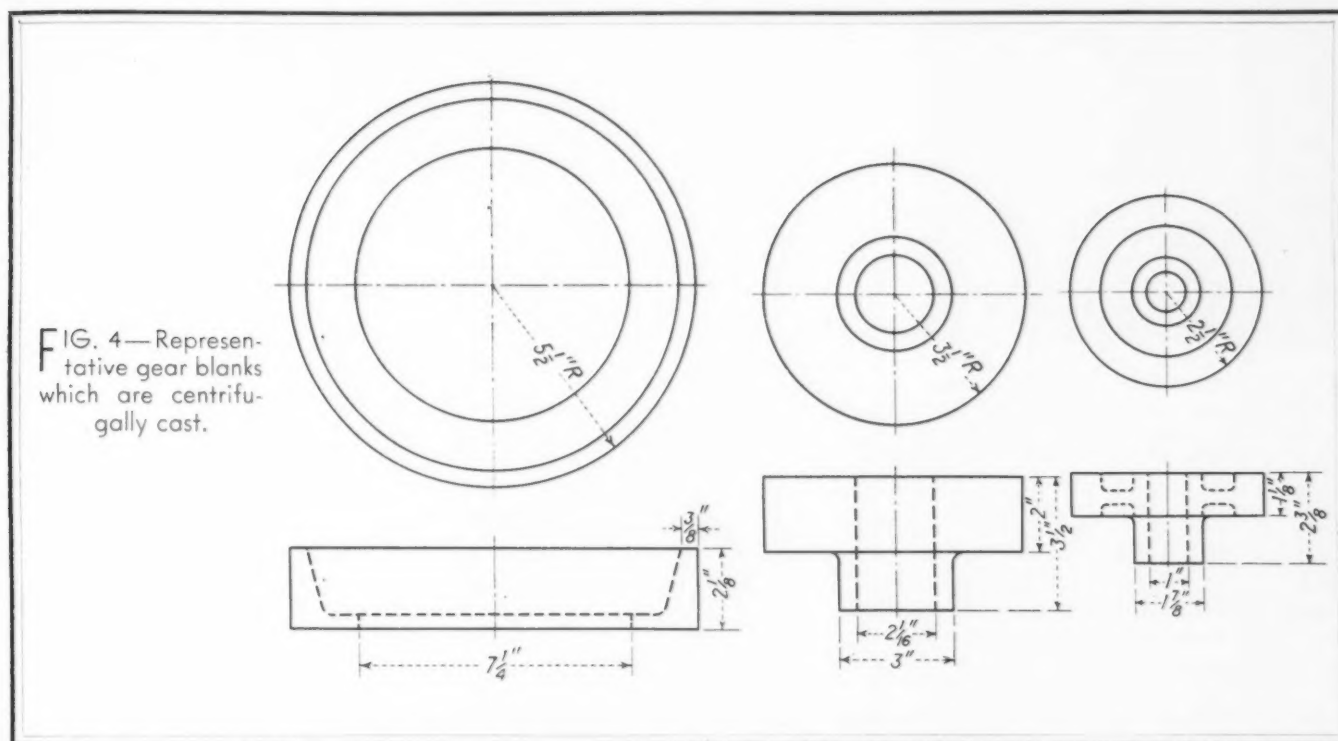


FIG. 4—Representative gear blanks which are centrifugally cast.

whereby the molten metal is either poured along the whole length of the casting by means of a trough which can be filled, inserted into the mold and then dumped, or poured through a retracting spout which moves from the rear end of the mold forward during pouring.

Centrifugal castings are usually made in dies or molds revolving about a horizontal axis. However, operation may be either about a fully vertical axis or one which is inclined at some desired degree to the horizontal. The choice is usually governed by the type of casting being produced as well as the limitations of equipment at hand. Long pipes and cylinders, for example, lend themselves best to production about an axis that is horizontal or nearly so, whereas short pieces such as gear blanks, are frequently produced on fully vertical machines.

Rotative speeds during casting will, as mentioned before, vary with the work at hand. As far as casting shape is concerned, the speed need be

proper speeds, however, and as these will all vary from one alloy to another, the "cut and try" method frequently takes precedence over the engineer's slide rule, with past experience and case histories the guiding influence.

Wide Variety of Casting

While it is true that not all shapes of castings can be made centrifugally, experience, improved equipment, and progress in methods have greatly increased the range of work that can be spun advantageously. Plain cylinders or bushings are, obviously, easiest to produce and comprise the greatest overall centrifugally cast tonnage. In a general sense any variation of this basic shape can be produced, the greatest limitation being that the inside diameter of the casting must be either a straight bore, or one which can be machined to the required contour without too great a machining cost or metal loss, a good example being a controllable pitch

centrifugally cast in bronze at the author's plant ranges from the smallest of 1 1/2 lb. to the largest to date, 8500 lb. and diameters vary from 1 1/4 in. to 54 in. Intermediate in these ranges is the 3000-lb. screw down nut shown in Fig. 5.

Most Bronzes Are Cast

Most copper-base alloys or metals can be cast centrifugally, although casting practice must often be varied from one alloy to another by virtue of the metal characteristics themselves. Greatest problems are presented by so-called alloys which are in reality mixtures, in that the ingredients do not alloy one with the other.

The copper-lead series is one such material. Lead and copper will not alloy, and by virtue of their differing specific gravities and melting points, a metal containing these two ingredients alone is one of the most difficult non-ferrous alloys to produce. Copper-leads can be centrifugally cast with



FIG. 5—A 3000-lb. screw down nut, centrifugally cast, for one of the steel mills in the Chicago district.

close attention to (1) chill effect so that the lead solidifies rapidly and without time to segregate into objectionable large particles; and (2) careful speed control, with (and corresponding casting pressure) well below that which would be used for production of castings from a true alloy. The spinning of this type of metal is usually confined to straight bushing stock having a wall thickness not exceeding 1 in.

Another alloy series which can be centrifugally cast is the copper-tin-lead group, a familiar example of which is 80-10-10, or phosphor bronze. Inasmuch as the presence of tin makes this an alloy rather than a mixture, higher rotative speeds can be used. Here the primary difficulty is the hot-shortness of the alloys, or low strength at high temperatures, which tends to cause the formation of fissures or cracks during the casting operation, unless proper control of speed, pouring temperature, and chill effect is exercised. With this alloy series, more complicated shapes and heavier wall sections can be successfully cast.

Alloys of the aluminum bronze class are ideally suited for centrifugal casting, the main precaution necessary being that composition must be carefully watched because of the aluminum losses which may be abnormally high due to excessive drossing caused by turbulence in the casting operation.

Hot strength and homogeneity of the alloy are good, and chill effect is of no great consequence; therefore, mold materials can be chosen without particular regard to the requirements of the alloy itself, and high casting speeds may be freely used. Complicated castings and very heavy wall sections can be produced in the aluminum bronzes.

Many other alloys including manganese bronze, nickel bronze, beryllium copper, and monel metal are adaptable to centrifugal castings. Most of these have certain peculiarities which

must be taken into account, but which can be compensated for on the basis of casting experience.

Advantages of Process

The advantages of the centrifugal casting process are many. The greater demands made on metals by modern industry have in some cases led to a distrust of castings for heavily stressed parts because of a sometimes overemphasized fear of casting defects. As a result, many parts have been made from forgings or wrought materials at a very appreciable pre-

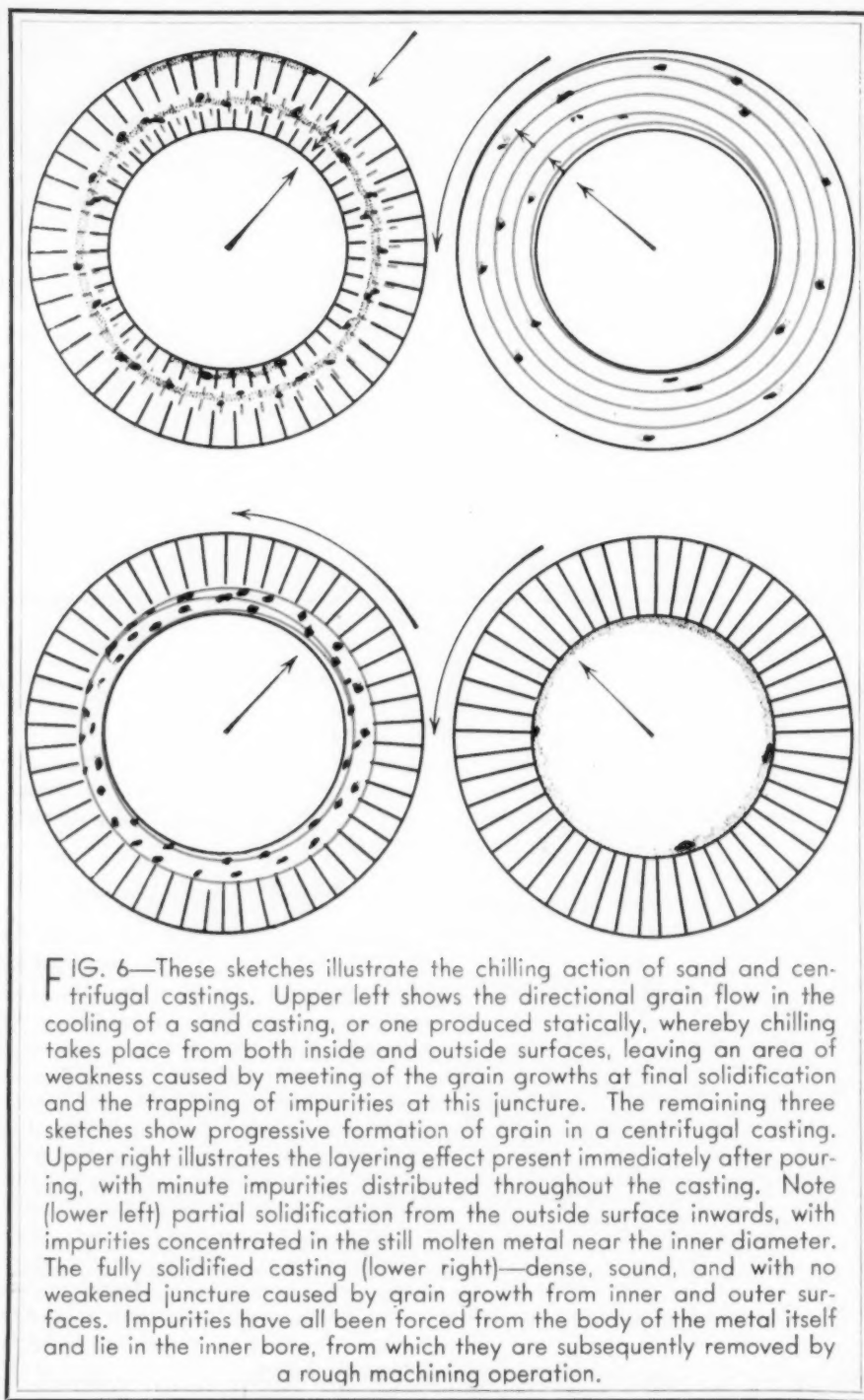
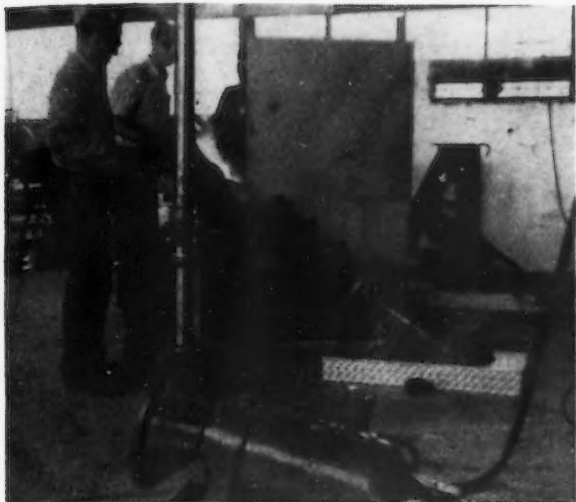


FIG. 6—These sketches illustrate the chilling action of sand and centrifugal castings. Upper left shows the directional grain flow in the cooling of a sand casting, or one produced statically, whereby chilling takes place from both inside and outside surfaces, leaving an area of weakness caused by meeting of the grain growths at final solidification and the trapping of impurities at this juncture. The remaining three sketches show progressive formation of grain in a centrifugal casting. Upper right illustrates the layering effect present immediately after pouring, with minute impurities distributed throughout the casting. Note (lower left) partial solidification from the outside surface inwards, with impurities concentrated in the still molten metal near the inner diameter. The fully solidified casting (lower right)—dense, sound, and with no weakened juncture caused by grain growth from inner and outer surfaces. Impurities have all been forced from the body of the metal itself and lie in the inner bore, from which they are subsequently removed by a rough machining operation.



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CLOSE-UP showing two of the centrifugal casting spindles and method of mounting retainers.

mium paid in the form of metal waste in machining, and high machining costs. That such parts, when of suitable design, can be made centrifugally at a definite saving is vouched for by, to mention one well-known instance, a large motor company's use of this method for transmission cluster gear production.

Many manufacturers are changing gears, feed nuts, and similar parts from sand to centrifugal castings because of the assurance of sound material and the consequent savings in machining costs through eliminating the liability of having to scrap not only material but also machining time on even a small percentage of defective sand castings.

The explanation for uniform soundness in spun castings is simple enough. Sand cast cylinders solidify progressively from both outside and inside surfaces. As a result of the fact that minute impurities in the metal are not trapped progressively in this chilling but tend to travel ahead of the solidifying crystals, any such impurities are concentrated where the two grain growths meet. This phenomenon is true of all statically cast metals, whether ferrous or non-ferrous, and is worthy of consideration. It is conceivable, for instance, that in the case of a feed nut the base of the nut threads would lie in this weakened zone.

Since in centrifugal casting the metal freezes from the outside surface only, there is no possibility of the above condition occurring. Furthermore, centrifugal casting largely eliminates so-called columnar growth of metal grain, breaking these columns into shorter, more closely inter-knit sections, having greater strength and homogeneity. Fig. 5 schematically

illustrates this and other differences in centrifugal structure as compared with sand cast structure.



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ONE of the small centrifugal casting spindles taken during rotation while the metal is solidifying.

The oxides of most metals are lighter than the metal itself, as are gases and possible non-metallic inclusions, such as bits of furnace lining, fire brick, or similar materials that might be present in a bath of molten

metal. Skimming before pouring removes most of those impurities, and provided freezing of metal in the mold does not take place too quickly, the balance tends to float to the top surface of the casting by displacement in the liquid metal.

In centrifugal casting this weight differential and "floating out" tendency is multiplied many times and impurities are literally driven out. Stated mathematically, the ratio of the force of centrifugal separation to that of gravity separation is $\frac{4^2 r n^2}{g}$

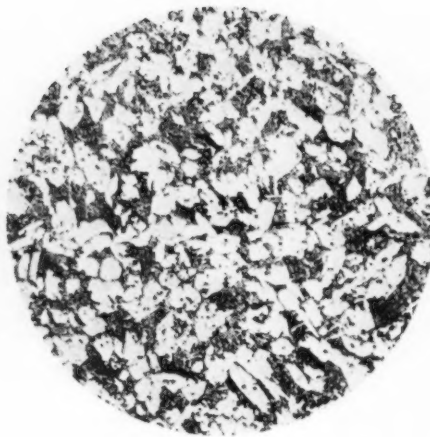
where r is the distance of the particle from the axis of rotation (in feet) and n is the number of revolutions per second. Taking as an example a casting being made centrifugally at 1000 r.p.m., and considering an entrapped oxide particle 4 in. from the axis of rotation, it is found that this

particle is driven from the body of the casting by a force 110 times that which would exist in a sand casting. No wonder the process has been called liquid forging!

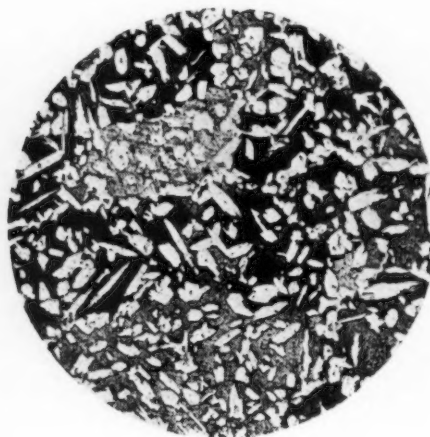
While the effect of this multiplied

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POURING of a large centrifugal casting which is rotated about a horizontal axis.

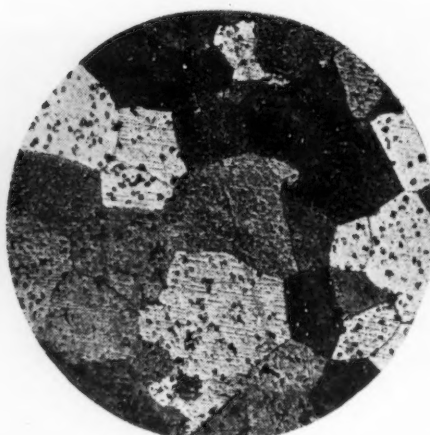
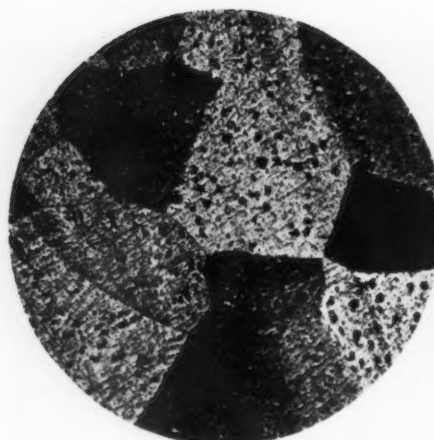




SAND cast (left) aluminum bronze—about 84 per cent copper, 11.3 aluminum, and 3.7 iron; same analysis centrifugally cast (right). Note the smaller particle size and extremely even distribution for the spun casting. At 100 diameters.



SAND cast (left) standard manganese bronze. The same material centrifugally cast (right) shows both the grain and particle size greatly refined. At 100 diameters.



SAND cast (left) manganese bronze of the high tensile variety; same material centrifugally cast (right). Difference in grain size is particularly evident. At 100 diameters.

casting pressure on physical properties of the resultant casting is definitely favorable, it is not as great as might be supposed. In general, tensile and yield strengths of the metal are raised from 10 to 20 per cent, hardness remains approximately the same except on alloys affected by chill action, and elongation may drop slightly. The greatest and most important effect from the engineer's standpoint, lies in the *uniformity* of the physical properties of centrifugal castings, for spinning does assure a uniformity difficult to obtain in static castings.

What Are Costs?

In a centrifugal casting, the inside diameter collects all the dross, or impurities, as has been seen. These are removed by a rough machining operation before the rough castings are shipped, the cost of that operation just about balancing the saving effected through obviating the necessity of pouring extra metal for gate and riser purposes. The cost of centrifugal castings, therefore, is in most cases more or less predicated on the quantity required, since setup charges for make-ready operations are covered by the per-pound price of the castings ordered.

As a general statement it may be said that when 20 or more centrifugal castings are required, the cost thereof to the customer is little, if any, more than for sand castings. There are, of course, many exceptions to the above statement; while it does not by any means hold true in all alloys, or all types of castings it will furnish a clue at least to the general picture of comparative costs. In the case of specially-shaped pieces, such as gear blanks or flanged bushings, an initial mold charge is necessarily made. That charge, borne by the customer, is comparatively minor, being on the average about 15 per cent of the cost of a comparable forging die. The manufacturer thereafter assumes responsibility for maintenance of the mold, which becomes his property.

This, then, is the general summary of the centrifugal casting process, and while all of the procedures outlined above are not universal, due to the diversity of practice and facilities in various plants employing the process, the general picture is essentially as outlined. Spun castings will continue to gain in popularity, and it is not doubted that the next five years will see wide general use of the process and wide recognition of the place of centrifugal castings in modern industry.

Boondoggling in Defense

By COL. H. A. TOULMIN, Jr.

IN THREE previous issues of THE IRON AGE, Colonel Toulmin has discussed necessary mental and industrial alterations necessary for the adequate protection of the United States, with one article devoted entirely to the strategic problems involved. Herein, attention is directed to specific military and industrial problems necessary for adequate air protection. Colonel Toulmin's ability for treating this problem is best expressed by a quotation from a citation by Mason M. Patrick, Major-General, A. S., U. S. A., Chief of Air Service, France, Oct. 17, 1918:

"I take this opportunity to express to you and to place on record my earnest commendation for the work which you have done as Chief of Coordination Staff. To this task you brought an understanding of its magnitude, the ability and untiring energy necessary for its accomplishment. Your work has been well done."

"WE are losing value and efficiency in the allied armies through lack of coordination and concentration."—David Lloyd George, April 9, 1918.

Lack of planning, vision, and coordination in the political high command is going to wreck the 50,000 plane program just as the 10,000 plane program was wrecked in 1917 and 1918.

In early 1917 it was announced that the country would produce 10,000 planes—a number in those days comparable in size relatively to 50,000 planes today. In 1917 as in 1940 great industrialists were to perform overnight magic in this production. Indeed, some of the very companies then operating to produce this magic

number of a great fleet of ships are the companies now expected, with similar organizations, to perform the same ballyhoo magic.

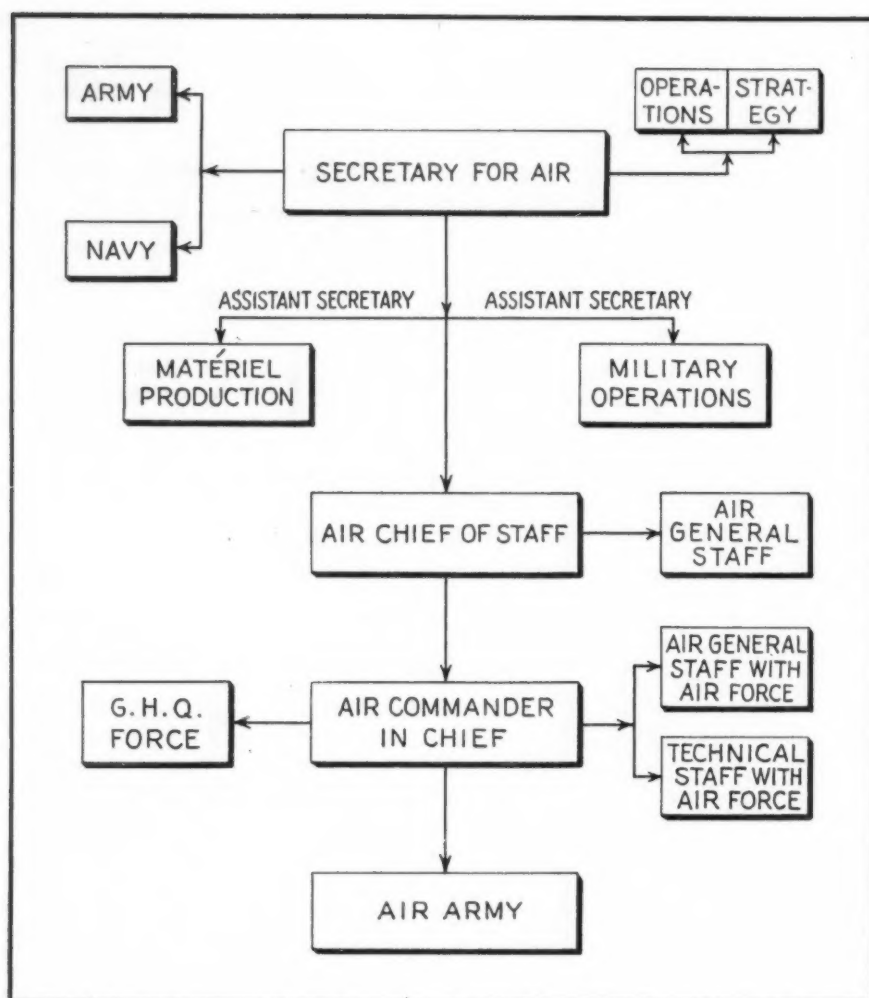
What was the practical results? The writer can speak from personal experience because when the reorganization of the United States Army Air Corps in France in May, 1918, was taken over, his plan of reorganization was adopted to correct the conditions in which in that month the United States Army had 35,000 men and officers overseas, but no squadrons active on the front. All this after 18 months of political planless talk and military blunderings.

The Air Service in the A. E. F. was completely and thoroughly disorganized for lack of business organization

and management. It had no American ships to fly despite the expenditure in the United States of nearly a billion dollars. It had no comprehensive and operable plan of coordination and mobilization. There was not a single United States plane in France of the 10,000 that were glibly promised nearly 18 months before.

Within six weeks of taking over the management and reorganization of the United States Army Air Corps in Europe as Chief of the Coordination Staff, the writer was able to put the squadrons on the front in support of the ground army. When the war terminated in November, there were more than 50 squadrons operating on the front with complete supporting organizations ready to put 219 squadrons in the air in the spring of 1919. There were 70,000 men and officers in the field. Over 9000 airplanes had been bought in France and England, and the most ever secured from the United States was 623 DeHavillands in October and November, 1918. They had to be completely rebuilt in France, both engines and plane structures, before they could be flown with safety. That was the sum and substance in nearly two years of the ballyhoo of 10,000 ships.

In making the Army Air Corps organization work, a Coordination Staff and a Strategic Staff were organized. A real mobilization plan was put into



effect immediately to get the materials and men together to operate on the front. Under the great leadership of General William Mitchell, those squadrons were operated with the army in a most effective manner. At the battle of Saint Mihiel, General Mitchell had under his command the largest group of airplanes ever assembled in a single battle up to that time—500 planes of France, England, Italy and the United States.

By putting vision and organization in the United States Army Air Corps it was made to function within a few weeks after its management was taken over. This was done without changing a single officer or man, without firing anybody, but putting into the proposition the same sort of executive ability, vision and organization that any responsible organization would require.

Now consider the present situation—50,000 ships are just a meaningless expense, *unless the army command is again revitalized*. First and foremost a Secretary of Air with Assistant Secretaries are needed, in charge of matériel procurement and military op-

erations respectively. The organization and military problems of handling this "air" army are far more difficult than anything ever attempted by the United States or any other nation. The order of ability necessary for the creation, organization, management and application of this force in war requires a type of ability far beyond anything that has been demonstrated or displayed in the United States Army today.

New Organization Needed

Consider next what is really needed in this new army organization of the air. Also keep in mind that many of the same types of military minds now in the regular army are like those which crucified General William Mitchell because he had the courage and the patriotism to point out to this country just exactly what is happening today. If there were justice, the men who court martialed Mitchell should be today court martialed themselves. This spiteful and disgraceful repudiation of a brave and great soldier, who also combined with his military qualities moral courage, wisdom

and vision, will remain forever a blot upon the military history of the United States.

Now keep in mind that danger for this country is from this same hidebound type of mind and reactionary military point of view, based upon the old idea of looking backwards at past wars to judge of the future. This type of mind has been trying to manage the new air corps and will manage it henceforth unless checked.

Also, it should be kept in mind that present danger comes also from defective political management of the military arm. The country is suffering from an epidemic of planless talk.

It is this same hidebound type of mind and reactionary military point of view based upon the old idea of looking backwards at past wars to judge of future conflicts that has been trying to manage the new air corps and plan for the air army in the future. Consider now the record of this management.

For the last five years very generous treatment has been accorded the air corps. What kind of ships were obtained? The Chief of Air Corps now admits that fast ships were secured capable of quantity production in a limited sense, which made profitable contracts for aircraft manufacturers. However, they lacked fire power, armor, flame proof gasoline tanks and cannons. To the uninformed public the excuse that these deficiencies were just discovered by reason of recent European combat looked good. Such an excuse was as worthless as the air into which it was spoken. Any competent second lieutenant should have had brains enough to have anticipated each and every one of these factors because they were of common knowledge and of public record in the Army Air Corps in 1918 and since then. There is nothing new about any of them.

The writer personally struggled with this armor problem in 1918 in France, and even then the trend was definitely toward the use of armor. The problem of puncture proof and shatter-proof gasoline tanks which could not be set on fire by incendiary bullets was solved. Also, 37 mm. cannons were successfully developed and mounted in ships. It is common knowledge that speed is only one factor in an airplane: the primary factor is armament and fire power because a ship is made primarily to hit and, secondarily, to maneuver or get away.

All these data have been recorded in the War Department files since 1918 and probably before. For the Chief

of Air Corps to come before Congress now and admit that many millions of dollars spent on aircraft produced nothing more than racing ships, with millions spent on such experimental gadgets, is sufficient condemnation of the brains and ability of the air service command.

Such an admission should have been sufficient for prompt remedy by the Secretary of War through a complete reorganization of the air corps management. The truth of the matter is that for many years the army air corps has been more interested in engineering types and changes, the constant change of absurd manufacturing tolerances, and the maintenances of speed records and other sporting events rather than in doing the hard, tough prosaic work of building combat ships of heavy striking power that can get military results.

This same management can overnight reduce the cost of aircraft not less than 30 per cent and can double the production of aircraft with present facilities by a 10 to 15 per cent reduction in manufacturing tolerances. Aircraft is now being built on the basis of an automobile to last four or five years.

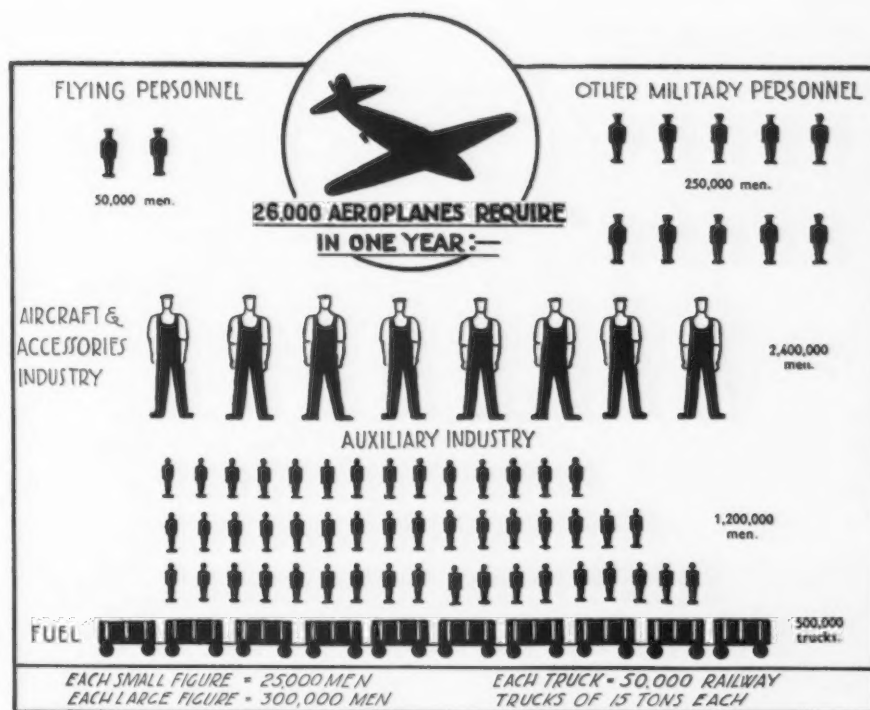
Every intelligent soldier of the slightest experience with air corps work knows that most ships last no longer than the average pilot's life. Most European nations of experience figure that 30 to 50 hr. in the air is all that a ship may do or will be permitted to do. Therefore, there is no point in the most meticulous refinement and accuracy with absurd tolerances for the most elaborate manufacture.

Most of this comes from the effort of the army to make the results of its appropriations last as long as possible in peace time. Producing for war fighting ships is quite another matter. If the Air Corps command had been on its toes, it could have remedied the situation. It is the old story of the army requiring absurd specifications which hamper the production of munitions and which makes them so dreadfully expensive and intolerably slow in production. Then the army blames the manufacturers. Here is where a forceful and well informed Secretary for Air, with a good staff, can put practical tolerances into the air program.

Air Organization Necessary

And now consider the third defect in air corps thinking which has not been remedied yet.

What kind of an organization



PERSONNEL REQUIRED TO BUILD, MAINTAIN, AND FLY A WARTIME AIR FORCE WITH A PERMANENT BASIC STRENGTH OF 26,000 AIRPLANES

(This chart, reproduced here from an article appearing in the April 5, 1940, issue of *The Aeroplane* (London), illustrates graphically the personnel requirements of an air force of 13,000 combat planes and 13,000 non-combat craft of all-metal construction and an average gross weight of 10,000 lb. The total replacements per annum in wartime would require at least 117,000 airplanes and 221,000 engine units to maintain the basic strength. As shown, part of the man-power is used in the aircraft and accessories industry for research and the production of fuselages, engines, propellers, and instruments, and the other part in auxiliary industries for the production of fuel, lubricants, uniforms, and their distribution and transport.)

should the future army of the air have? The words "army of the air" are significant—that is exactly what is required. It must not be a mere hand-maiden and back stairs servant to the ground troops or the navy.

The success of Germany is not due to its large number of planes or its efficient manufacture. It is due to the fact that the army organization and command of the air is separate and independent, created for the benefit and purpose of taking advantage of the peculiar striking offensive powers of this arm.

The first conception must be that this "army of the air" is fully capable in and of itself to completely perform all of the functions of reconnaissance, attack, artillery fires, taking and holding of the ground and the supply of the air corps completely from the air. Until this is engendered in the army air command, there will not be a real army of the air to take advantage of these 50,000 planes.

For instance, these dive bombers, light and heavy bombers and torpedo planes are artillery. The swift reconnaissance and attack ships constitute the cavalry and shock troops, the mechanized cavalry of the air. Parachute troops in transport planes for

infantry, artillery and tanks constitute the infantry of the air. Reconnaissance planes and artillery fire control planes, with their signal and communication systems, constitute the signal corps of the air. Ground strafing planes and pursuit attack ships constitute the shock attack troops of the air. The huge transport ships must be able to transport food, gasoline, munitions, water, engineering tools and similar impedimenta of an army, constituting the trains of the air.

This equipment can be landed either by the ships themselves or by parachute. There must be flying machine shops, flying ordnance shops, and flying airdrome gyro repair shops, capable of alighting on airdromes that have been destroyed, with adequate engineer equipment aboard to restore those airdromes for other types of ships so that they can land. The latter type of ship will probably be of the helicopter type like the autogiro. It will be so designed that it can land with repair equipment on limited areas so that fields that have been destroyed by bombarding or by explosion can be repaired for the fast landing pursuit ships and bombers of the main air force. In other words, the army of the air with 50,000 planes must be as

complete and self contained as any other army. It must be just as independent of ground troops as the land army has been in the past, before 1914, of air troops.

But the most important thing this army organization of the air needs is this: *A separate independent general staff and army command.* The required power of imagination and conception of the organization, management and direction of an "air army" is so vastly different from the conceptions of the ground military organizations that it is necessary and essential that this general staff and command be entirely independent of the regular army's general staff.

This does not mean that the high command of the regular army will not coordinate its operations with that of the army with the operations of the land and naval forces. It does mean that this army of the air requires such a highly specialized organization with 50,000 ships, that the complete air organization will demand a general staff larger and more effective than the present staff we have for the small regular army.

In 1927 in "Air Service, A.E.F. 1918," the author wrote the following as a prediction of what the United States Army should have for its army of the air:

- "(a) That the Air Service should have a complete plan of organization, mobilization, and supply for immediate use in the United States and in foreign areas of possible operation, in which all the details are completely worked out for immediate execution.
- "(b) That the Air Service should have a staff of its own in addition to its General Staff representation and affiliations.
- "(c) That a plan is necessary for maintaining manufacturing sources alive for future air supplies.
- "(d) That aircraft armament should be made, furnished, and repaired under a system in which the Air Service should have the final approval. There should be no divided authority.
- "(e) That the Air Service should have ample schools for the training of its men and officers and the temporary education of ground troops to promote that close understanding between the air and the ground essential for an army's success.
- "(f) That a separate promotion list is of course essential, with adequate compensation for the extra hazards in time of peace, to attract proper personnel and maintain morale.

"(g) That a great system of supply depots, repair shops, dumps, and the like must be worked out in complete detail and tested sufficiently to determine its successful working.

"(h) That a study should be continued of the new strategy and tactics of the air, as our schools of the Staff and Command now provide for the ground."

These predictions in 1927 are amply confirmed by the events of 1939 and 1940. Even assuming that 50,000 planes are available (the allied armies had 22,000 operating in the war in November, 1918), the thing that counts is the vision and organization of this force to take full account of its effectiveness.

This brings the author to the final statement. What the United States Army lacks is a "plan." It lacks this plan for both the ground troops and for the air corps. This is not a criticism of the regular army, but it is a criticism of the political components of the government which have plunged into this great maelstrom of production of equipment and tanks, mechanized and motorized equipments and of planes without having a concrete and definite military plan of operation in mind. Generalities are insufficient, for such an equipment must be designed and organized for specific purposes.

Is the country to have an "Over Seas Command" such as was set forth in the author's previous article relative to the chain of islands along the Atlantic and Pacific coasts? Is the country to be organized for expeditions requiring landing parties? Is there to be attempted the old-fashioned landings by sea? Is the force going to be so modernized as to be able to make landing by air on foreign coasts just as the Germans have done, but only more extensively and effectively?

The era of marine corps landings, efficient as they are by sea, will be over. Such landings are no more possible against organized resistance than the marchings of the legions of Frederick the Great in close massed formations would be feasible and practical today with ground armies. Such landings are all right against disorganized forces of South American countries not equipped to meet any such attacks because of political disturbances, but they are silly and futile things in attacks against an organized position of any enemy that is competent to defend itself.

These great motorized and mechanized forces on the ground, the author predicts, are but a transient phase

in the new warfare. In a few years they will be as obsolete as foot troops, marching from place to place on foot great distances, are obsolete today. Such mechanized equipment will all be transported by air. The days of long ground treks will be over except for mopping up purposes.

But to return to the plan, is the country organizing a defense command? Is it organizing for expeditions into Mexico and South America? Is it organizing to make landings in South America further south? Is it organizing to take and possess the islands of the Pacific? Is it organizing for an attack upon Japanese mainlands? Is it going to crawl into a set of forts around its borders and be caught like rats in traps as was the French army in the Maginot line? Is it going to provide a system of alternative landing fields and means of repairing landing fields so that no matter what damage is done to the air corps bases, it will be able to ship to new bases and repair the old between sundown and sundown? These and other countless questions are necessary to be determined before the country can plunge into this great mass commitment of all of its resources to certain kinds of equipment.

This leads to the final and ultimate conclusion. When managing great new forces—a two-ocean navy, an armed force of from 1,000,000 to 4,000,000-man army of the mechanized and motorized forces, and an army of the air with 50,000 planes and a million or a million and a half men to operate them and supply them, the country has gone beyond the limits of any one department to coordinate with another department voluntarily.

This will necessitate a Defense Command and a Defense Cabinet Minister to coordinate these three branches of the service and the supply of all three branches through the Council of National Defense. Here must be located the master mind and the directing agencies for the coordination of these forces with adequate strategic and operations staffs.

Here again Germany has shown the wisdom upon which she has based her success of having this unitary command. Wherever the operations are purely land or purely naval, the respective commanders are in command. But where it is necessary to coordinate all three forces, there is appointed a supreme commander who can coordinate them and give the orders. Nothing is left to acquiescence, cooperation or internal politics in the three services.

Salvaging Aluminum Rivets



ABOVE

LENGTH sorting machine. As the rivets travel, heads up, along the incline track from the feeding hopper, they ride into teeth cut into the perimeter of the big wheel and are carried around until they strike their respective length gages and are knocked off into bins.

o o o

CLEVER rivet sorting machinery will lop off around \$12,500 from an estimated dead loss of some \$15,500 at the Glenn L. Martin Co., plant at Baltimore, maker of the well known Martin Bombers and Flying Clippers. Long ago Martin production engineers decided it was cheaper to forget about aluminum alloy rivets accidentally dropped on the floor than have riveters take time out to recover them, especially since a single worker is expected to drive 1000 rivets a day. Nevertheless, 60 lb. of rivets swept up a day, at \$1 per lb., were not to be ignored, so a team of youths was set to work sorting them by hand. They were not even able to pay their way.

Then an S.O.S. went out to the tool design department. The three machines pictured here were designed and built at the plant. As a result, the heterogeneous collection of rivets clatter down a track from a hopper, click

BELOW

THIS little hand operated machine separates roundhead and flathead rivets at high speed, relieving the length sorter of the burden of separation where a large number of rivets are to be sorted. It will sort 100 lb. of 5/32 in. rivets in 8 hr.



o o o

AT RIGHT

AFTER the steel bolts and nuts have been picked out of the sweepings by electromagnet, the aluminum rivets are first shaken through a series of sifters which separate them by diameter.



into little slots in a wheel and drop off the perimeter into sorting boxes. They are segregated first by diameter, then by head style (universal or counter-sunk) and finally by length. But since the floor sweepings comprise, besides the rivets, a mass of screws, bolts and nuts and odd shapes of metal, an electromagnet is first passed over this collection, snatching out the extraneous iron and steel parts. The residue is chiefly rivets of some 150 different kinds which are passed through the sorting machines shown.

LAST week the author described stress raisers and the effects of notches on static tension, etc. Herein, concluding this correlated abstract, Mr. Sachs describes the effect of notches on impact bending, and the impact characteristics of various steels. All these data are particularly timely in view of the many products now being made which must not fail in service.

THE EFFECT OF NOTCHES ON IMPACT BENDING: An extensive literature deals with the notched bar impact bending test. However, confusion is rather prevalent as to the practical and academic meaning of the results obtained by this test, which measures the energy that metals will absorb under a rapidly applied force action.¹³

The unique position of this test is based on the phenomenon that all ferritic steels break brittle if tested at a sufficiently low temperature (See Figs. 11-14). On the contrary, many other metals, including the austenitic steels (See Fig. 13), do not become brittle at all in impact tests,¹⁴ even at extremely low temperatures.

However, this behavior is not restricted to the notched bar impact test. All ferritic steels also break brittle if tested in static tension at very low temperatures, while non-ferrous metals and austenitic steels become slightly stronger with reducing temperatures without losing their ductility.^{15, 16} Thus (see Fig. 15), carbon steels in the commercial polycrystalline condition have been found to become brittle in tension tests if the testing temperature is lowered as far as -330 deg. F. (-200 deg. C.). This is a fundamental characteristic of the iron crystals, which cannot deform by crystallographic gliding at temperatures below -240 deg. F. (-150 deg. C.) but break brittle and develop cleavage planes¹⁷ in much the same manner as other brittle material, such as rock salt or antimony.

The effect of temperature on the ductility of the metals appears to be closely correlated with their crystal structure. Most pure metals crystallize in the three simple lattice types, the face-centered cubic, the body-

centered cubic and the hexagonal close-packed arrangements. The majority of metals, such as nickel, copper, aluminum, silver and gold have a face-centered cubic crystal structure. All of these metals and many of their alloys are very ductile even to the lowest temperatures that have been investigated at the present time. Only the very high melting members of the face-centered cubic class, iridium and rhodium, become rather brittle at temperatures in the usual working range of the other metals. Practically all the remaining metals are more or less brittle at temperatures which are low in comparison with the melting points. This is particularly true if the metals have a coarse grain size.

The body-centered cubic metals, such as iron, tungsten and molybdenum, offer considerable difficulties

Stress

under certain conditions because of brittleness at room temperature. This statement also applies to the hexagonal close-packed metals—magnesium, zinc, and cadmium—in spite of their relatively low melting points. All other metals have more complicated crystal structures and are only ductile at temperatures approaching their melting points—except tin, which is very ductile at room temperature, but also becomes brittle if subjected to impact at low temperatures.¹⁴

FIG. 11

THE effect of the fillet radius on the impact strength of a carbon and of a nickel steel at various temperatures. (Armstrong-Gagebin.)

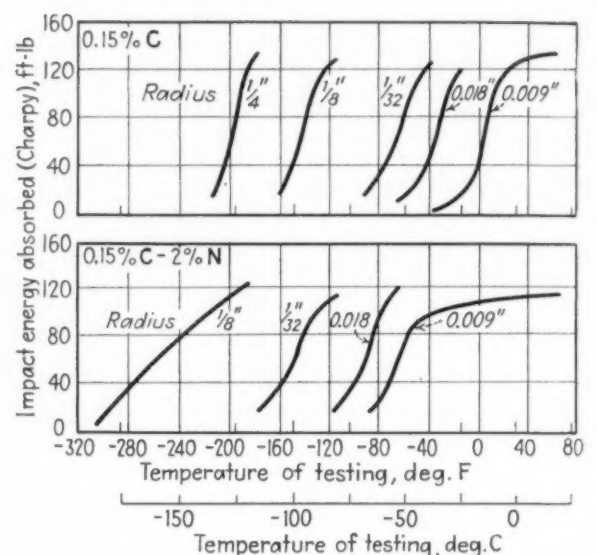
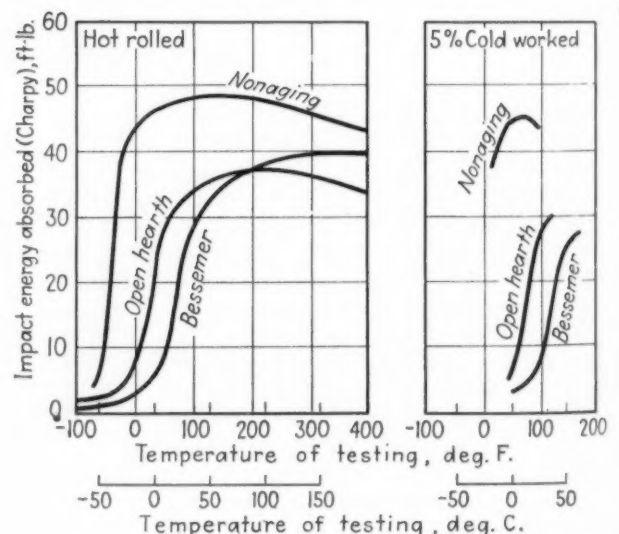


FIG. 12

THE energy absorbed in notched bar impact tests at various temperatures by different types of mild steel in the hot rolled and cold worked condition. (Epstein.)



Raisers

The particular importance of the notched bar impact test is based on the phenomenon, that the temperature at which any steel becomes brittle¹⁸ is raised by the two factors which primarily characterize this test and distinguish it from the more common static tests, the high speed of testing and the notching. It has been observed, for example,¹⁸ that a normalized 0.25 per cent carbon steel (See Fig. 16) exhibits a low impact value and a brittle break (with a spe-

cific notch) below the freezing point, while this embrittlement or "critical impact temperature" is lowered to approximately -20 deg. F. (-40 deg. C.) in a static notched bar bending test and to -240 deg. F. (-150 deg. C.) in an impact bending test on a cylindrical bar. Thus, the notching is considerably more effective in raising the critical temperature and increasing the danger of a brittle break than the velocity of testing.¹⁹ However, both factors acting simultaneously transform a steel that appears ductile down to a temperature of about -330 deg. F. (-200 deg. C.), if tested in static tension or bending, into the brittle condition at temperatures up to the freezing point.

The efficiency of a notch in this respect again depends upon its sharpness (see Fig. 11). The critical tempera-

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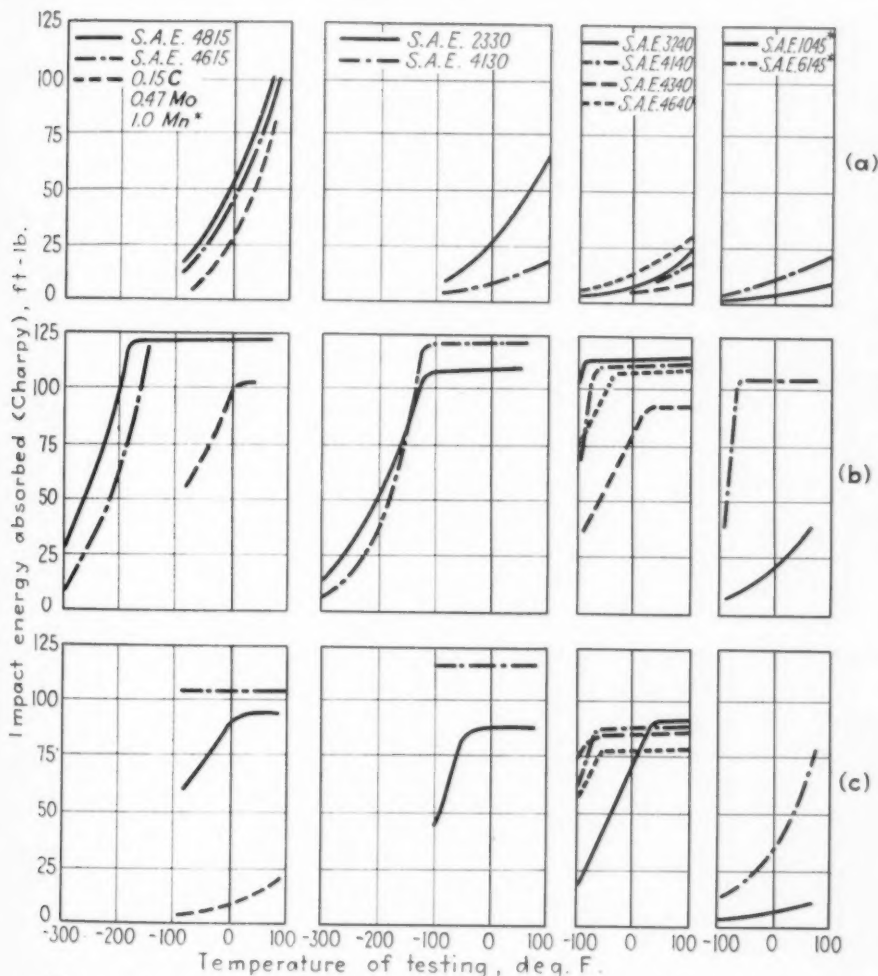
ture of a 0.15 per cent carbon steel may be as high as +10 deg. F. (-15 deg. C.) using impact specimens with a sharp notch having a fillet radius of 0.009 in. while it is as low as -200 deg. F. (-130 deg. C.) if the fillet radius is $\frac{1}{4}$ in.¹⁹ With a 2 per cent nickel steel, the corresponding critical temperatures are -60 deg. F. (-50 deg. C.) and lower than -310 deg. F. (-190 deg. C.).

Another factor in the procedure of testing¹⁹ which raises the critical impact temperature is an increasing breadth of the specimens. An increase of the total dimensions of the specimens also acts similarly.¹⁸ Brittle breaks have been observed in notched test bars of 4x4 in. cross-section, while smaller test bars machined from the same material became increasingly ductile with reducing dimensions of the test bar, all conditions being observed to maintain precise geometrical similarity.¹¹ This explains the occasionally reported observations that the regular notched bar impact testing fails to reveal a brittle break for a large piece that had failed in a brittle manner in service.

Impact Characteristics

A decisive improvement of the low temperature impact characteristics of low carbon steels (carbon under about 0.40 per cent) is obtained by proper deoxidizing.^{21, 22} Silicon-killed steels possess a lower critical temperature than rimmed steels, and thoroughly killed steels containing definite amounts of aluminum in solution appear to retain their impact toughness to temperatures about 100 deg. F. (55 deg. C.) lower than non-deoxidized steels (see Fig. 12). On the other hand, Bessemer steel²³ that is rich in non-metallic impurities such as oxygen, nitrogen, phosphorus and sulphur, has been found to be particularly susceptible to brittle breaks and to possess a high critical temperature. Failures of Bessemer steel structures at low temperatures have been frequently reported.

The critical temperature of any steel is further raised by cold work and by the subsequent strain aging at room temperature or at a short time



* Coarse grained in the conditions (b) and (c)

FIG. 13

IMPACT characteristics of various steels, according to experiments by Herzig and Parke, illustrating the effects of carbon content, alloy and heat treatment: (a) normalized; (b) heat treated to 200 Brinell; (c) heat treated to 300 Brinell.

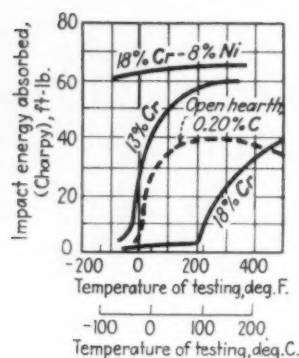


FIG. 14

THE impact strength of several stainless steels at various temperatures. (Sergeson.)

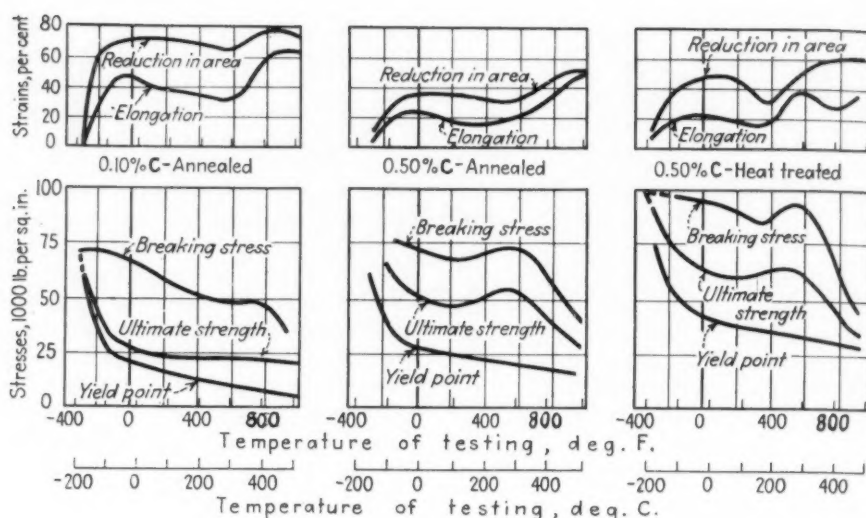


FIG. 15

ABOVE

TENSILE properties of some carbon steels at different temperatures. (Goerens and Mailaender.)

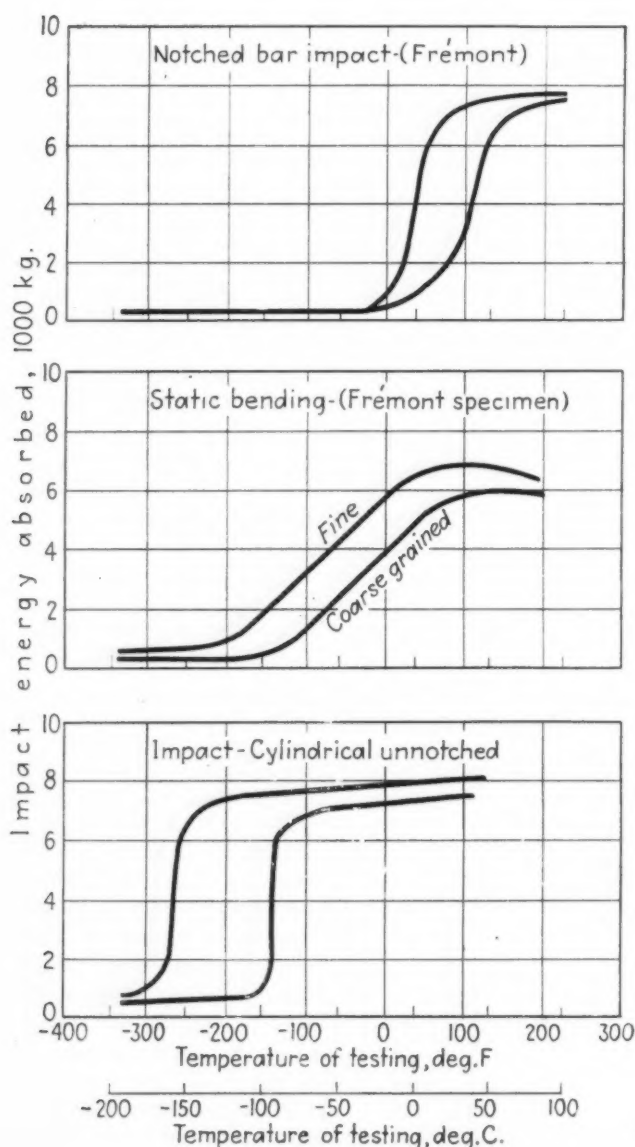


FIG. 16

LEFT

ENERGY absorbed by a 25 per cent carbon steel in various bending tests at different temperatures in both the normalized (fine grained) and in the over-heated (coarse grained) condition. (Davidenkov.)

treatment at elevated temperatures,^{23, 24} such as occurs in hot galvanizing. Both effects are again more pronounced with insufficiently killed or impure steels than with the thoroughly deoxidized "non-aging" steels that have been recently developed.

It has been further observed²⁵ that the surface condition of an impact specimen decidedly influences the critical temperature. The surface layers of the machined specimens are in a cold-worked condition, and removing this strain hardening²⁶ by etching or polishing plus annealing may lower the critical temperature of unnotched specimens in a 0.40 per cent carbon steel by as much as 90 deg. F. (50 deg. C.). Additional cold working of the surface by shot blasting or surface rolling, on the other hand, increases the critical temperature by 60 deg. to 90 deg. F. (35 deg. to 50 deg. C.). Carburizing the surface of a low carbon steel also increases considerably the tendency to develop brittle fractures in unnotched impact specimens, and this effect becomes particularly pronounced in case hardened deeply carburized steels.²⁰

The type of heat treating is another factor that affects considerably the critical temperature of a given steel. The fact that a hardened steel becomes very brittle if overheated and coarse grained²⁸ is generally known. However, little fundamental information is available on this subject. Overheating also affects the impact toughness of a normalized steel.¹⁸ If a 0.25 per cent carbon steel is overheated, such as by heating for 3 hr. at a temperature of 2000 deg. F. (1100 deg. C.), the critical temperature is considerably raised in comparison to that of a properly normalized condition (see Fig. 16).

This holds true for any type of testing, whether notched bar impact, static notched bar bending, and impact bending of a cylindrical bar.

Steels in the heat treated condition (see Fig. 13) are generally superior to the normalized metal regarding the low temperature impact properties.²⁸ Heat treated carbon and low alloyed steels containing 0.15 to 0.45 per cent carbon have been found, if quenched and tempered to a hardness of 200 Brinell units, to retain their impact toughness to particularly low temperatures, and to lower temperatures than the same steel when heat treated to 300 Brinell (see Fig. 13). The normalized condition shows usually the highest critical impact temperature for each particular composition.

The critical impact temperature of carbon and alloy steels increases with increasing carbon content (see Fig. 13), while alloy steels are generally superior to similarly treated carbon steels regarding their low temperature impact properties. Many elements are valuable in small percentages as alloying additions in this respect, such as zirconium, vanadium, chromium plus copper²¹ nickel^{20, 22} (see Fig. 11), and particularly nickel or chromium in combination with molybdenum.²³ Austenitic alloys, possessing the cubic face-centered crystal lattice of α -iron, do not become brittle at all at low temperatures (see Fig. 14), as already mentioned. Thus, austenitic stainless steels are suitable without restriction for low temperature service,^{29, 30} while the stainless chromium irons should not be used where shock is a factor of any magnitude at low temperatures or even at room temperatures.

Impact tests with notched tool steel specimens subjected to torsion have

also been carried out³¹ and show a remarkable absence of any similarity between the results of these impact torsion tests and those of impact bending tests. This discrepancy remains without any adequate explanation up to the present time,³² but the results of the torsion impact tests appear to be affected by structural changes occurring during deformation.

Attempts have been made to correlate the impact characteristics of a specific steel and the effect of different factors on the critical impact temperature with the conception that a brittle break will occur if the flow resistance of the metal assumes the same value as the cohesive strength.^{5, 18} Thus (see Fig. 16) the three factors—lowering of temperature, notching, and increasing the velocity—raise the flow resistance, while defects and mistreatments of different types—such as coarsening of the austenitic or ferritic grain, cold work and aging—reduce the cohesive strength.

Therefore, it would be expected that any factor that raises the critical impact temperature reduces the cohesive strength or increases the flow resistance correspondingly. The cohesive strength of a metal can be measured if a completely brittle condition in static tests is obtained. Such a condition has been realized in notched steel specimens at the temperature of liquid air and it has been found, indeed, that overheating which raises the critical impact temperature (see Fig. 15) reduces at the same time the cohesive strength.²⁷ It has been also observed that at such low temperatures cold work may increase the flow resistance (yield strength) faster than the cohesive strength and thus eventually transform the originally ductile metal into the brittle condition.³³

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- ³¹ G. V. Luerrssen and O. V. Greene, *Trans. Am. Soc. Metals*, Vol. 22 (1934), pp. 311-346; Vol. 23 (1935), pp. 861-885; Vol. 38 (1940).
- ³² N. Davidenkov, *Techn. Physics U.S.S.R.*, Vol. 3 (1936), No. 6.
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C-I Expands Heat Treating

THE steadily increasing demand for heat treated alloy steels has necessitated enlarging furnace and quenching facilities at the South works plant of Carnegie-Illinois Steel Corp., Chicago. A new, electrically heated, bell-type heat treating furnace recently has been installed there together with a second quenching tank, giving three furnaces and two quenching tanks equipped to operate under full automatic control.

The furnaces are designed to handle up to an 18,000-lb. load, taking bars up to 10 in. in diameter and 30 ft. long or plates up to 52 in. wide. The load rests on a series of heat-resisting alloy grids 21 in. above the car bottom. A double row of heating elements on each side wall and a triple row in the roof of each furnace provide rapid, uniform heating of the load, the design assuring heating of the charge from the bottom as well as the top.

Design and heating capacity of the furnaces are such that a uniform temperature can be maintained throughout the charge, automatic controls being provided to maintain this temperature. During the cooling cycle the controls are reset manually at prescribed intervals. Rapid, controlled heating with a minimum of scale and a minimum of decarburization is possible in these new furnaces.

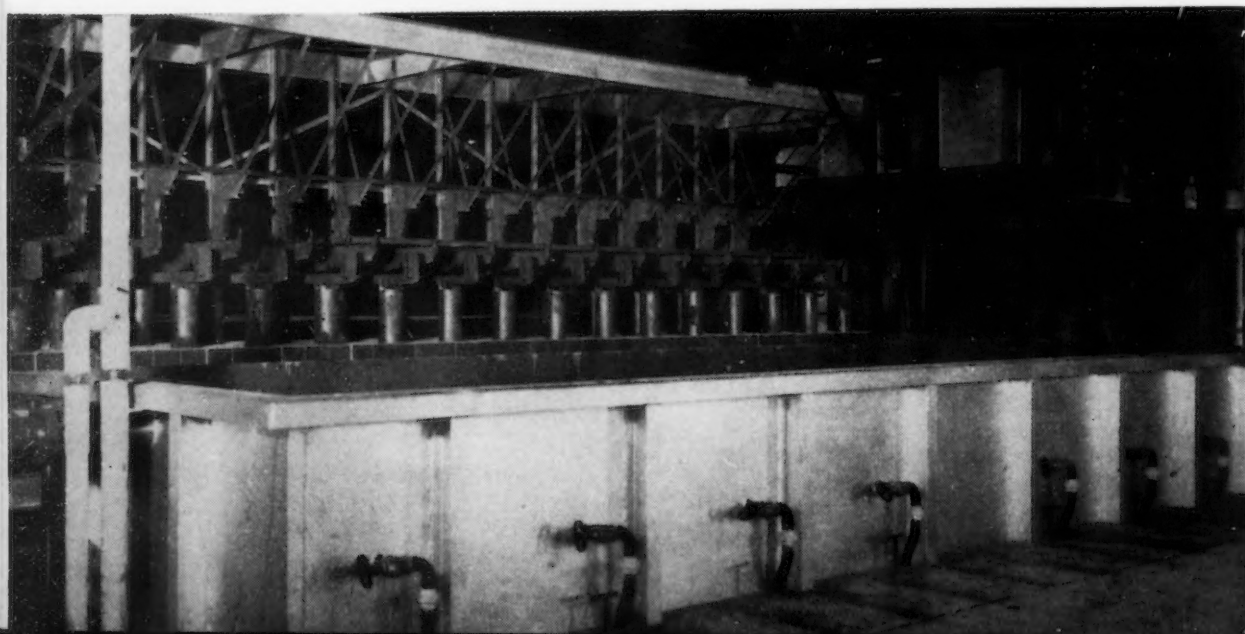
Uniform results depend upon the

maintenance of uniform practices and the automatic facilities installed in connection with these heat treating furnaces and quenching tanks make this possible. The load for any furnace is assembled on a special charging table in a single layer in the case of heavy bars or in a double layer for lighter sections. When the charge is ready, the furnace bell is raised and the furnace car run out under a traveling crane which travels the entire length of the heat treating building. This crane is fitted with a series of carrier arms spaced to fit between the supporting grids on the furnace car, which conform to the spacing on the charging table. The load is transferred as a unit on these cars to the furnace car. This is then run back under the bell, which is lowered and the heating cycle started.

All operations are controlled by a single operator from the control pulpit, so located that the operator has a clear view of all manipulations. The electrical system is so arranged that any operation may be controlled manually or any sequence of operations may be set to advance automatically. Eleven such sequences may be pre-set. The operator chooses the desired cycle by setting a selector switch on the control panel and then closes a master control switch, after which the mechanism functions automatically. This is particularly important in connection

with treatments involving quenching. A typical sequence runs as follows:

- (1) The crane is brought to its stand-by position by manual control.
- (2) The selector switch is set for the desired cycle for quenching the load and the master control switch closed, providing for the following automatic operations:
 - (a) The furnace bell rises.
 - (b) The furnace car is moved into position under the crane runway.
 - (c) The crane moves into position over the car with the carrier arms in position beneath the charge.
 - (d) The charge is lifted, carried to position over the quenching tank and lowered into the quenching medium.
 - (e) The charge is alternately raised and lowered in the quenching medium for a predetermined length of time at a rate best suited to the steel being quenched.
 - (f) At the completion of the cycle the crane comes to rest over the quenching tank.
- (3) The selector switch is then set for the next automatic cycle for charging the load into the tempering furnace which has been set for the desired temperature.



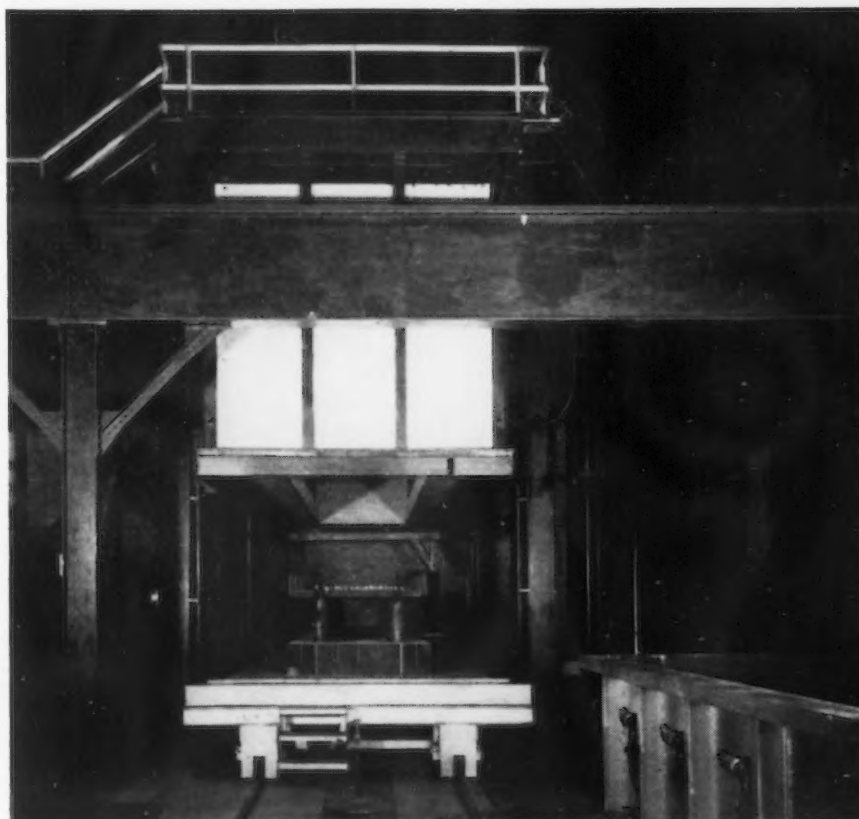
CRANE grapple removing bars from car after treatment in new bell-type heat treating furnace at South works. Quenching tank in foreground is capable of quenching from as high as 2000 deg. F.

g Facilities..

- (a) The furnace bell of the second furnace rises.
- (b) The furnace car moves into position under the crane runway.
- (c) The crane places the charge on the furnace car and moves back to clear the car, coming to rest in its stand-by position.
- (4) The furnace car is then moved back into position under the furnace bell, which is lowered. These operations are both under manual control.

The quenching tanks, one being used for oil and the other for water, each have a capacity of 18,000 gal. and are large enough to permit the crane to submerge the full load completely. In this way each piece receives practically an individual quench, but uniformity of treatment is maintained regardless of the number of pieces in the order.

A wide variety of alloy steels are heat treated at South works, ranging from the low alloy grades up through the austenitic stainless steels. The furnaces are designed to operate at temperatures as high as 2000 deg. F. with automatic control to maintain close temperature regulation. This permits quenching from as high as 1950 deg. F. as in the case of 18-8 stainless steel, and assures ample heating capacity when quenching from lower temperatures. The set-up is such that a com-



NEW heat treating furnace with bell raised to permit removal of car with load of bars to 18,000-gal. capacity quenching tank in right foreground. A complete furnace load may be quenched in oil within 90 sec. or in water within 2 min. from the time bell is raised

plete furnace load may be quenched into oil within 90 sec. or in water within 2 min. from the time a furnace bell is raised.

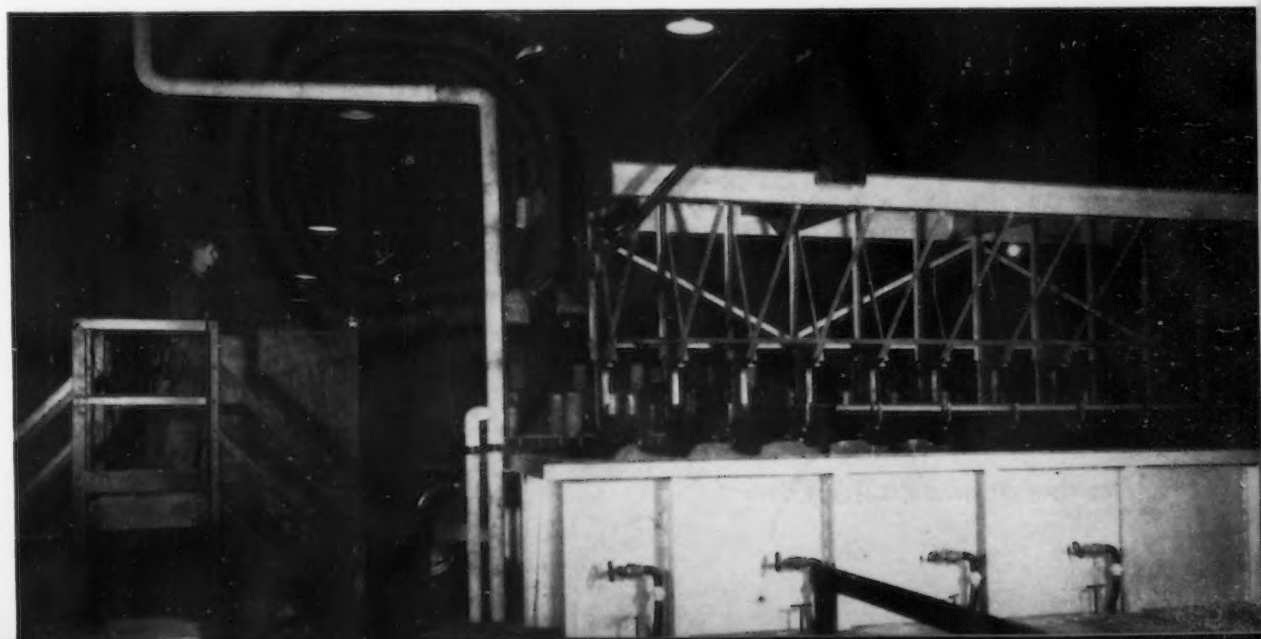
Quenching bath temperatures may be controlled by circulating the liquids through heat exchangers, permitting the bath to be warmed if the liquid is too cold during winter months, or cooled as may be necessary when operating on short cycles or from high temperatures.

Although the equipment is largely used for quenched and tempered material, it is adaptable for use in an-

nealing, normalizing, normalizing and tempering, stress relieving, or spheroidizing. Quenching and drawing operations are ordinarily confined to bars.

Automatic equipment assures close control of heating time, permits more accurate control of heat loss between the time the load leaves the furnace and the moment it is first quenched, makes possible uniform quenching, and speeds up production as well as assuring uniformity at all times. These features are all embodied in this heat treating installation.

LOAD of bars being delivered by crane grapple to quenching tank after treatment in furnace. Here the bars are cooled to the required temperature before removal to Brinell testing bed for physical tests.



A.C. Welding Aids Metal

THE metal fabricator has favored rotary type d.c. machines as a source of power for arc welding operations in the past because of their early development and the difficulty in securing suitable electrodes adaptable for a.c. welding. However, the equipment manufacturers and electrode suppliers have now anticipated the fabricators' demand for a.c. welding accessories and equipment.

There is still considerable controversy as to the preference of d.c. over a.c. as a source of power for arc welding. Each has certain applications for which it is superior and both are highly satisfactory to the fabricator.

A.c. transformer-type machines are increasing in popularity with the small job shop welding, the cross-road corner garage, and the heavy fabricator because of its adaptability and economy.

The first cost of a transformer-type machine is considerably less than that of a rotary type d.c. machine. This is of great importance to the smaller fabricator or shop owner because of lack of capital and the need to keep capital investments at a minimum.

Maintenance is also an important consideration and the a.c. welding set appears to possess advantages over the rotary-type machine because it contains no rotating parts. This one characteristic of the a.c. machine is important to the fabricator as he is not required to maintain a supply of repair parts or suffer loss of time while repairs are being made.

The characteristics of a weldment deposited with a.c. are comparable with one deposited with d.c. Some operators are of the opinion that the a.c. arc agitates the molten pool of metal more than d.c., resulting in a more homogeneous weld with less possibility of gas holes or slag inclusions. This is a controversial subject; but radiographs of weldments show that either a.c. or d.c. will provide excel-

lent weldments free of defects when the proper welding technique is used.

Welding speeds for a.c. and d.c. are comparable. Melting rate tests on a group of heavily coated electrodes adaptable for both d.c. and a.c. welding at the same current with a given electrode show that for the smaller diameters of electrodes the melting rates are equal for either a.c. or d.c., but that the $\frac{1}{4}$ -in. diameter electrode favors d.c. power. (See accompanying curves.)

The operator quickly discovers that he can increase the welding current for a given weld when he is using a.c. because he is not troubled with magnetic blow. The increased welding

current increases the melting rate of the electrode. The freedom from magnetic blow also reduces loss of transferred metal from the electrode in the form of splatter. This increases the deposition efficiency of the electrode and reduces the cleaning time of the welded parts.

A comparison of power costs shows that an a.c. welder with efficiencies from 85 to 90 per cent as compared with the 50 to 60 per cent efficiency of d.c. motor-generator type machines will average 35 per cent less for equivalent current capacities.

This energy saving, shown in the table, which amounts to 35 per cent, was brought about not only by higher

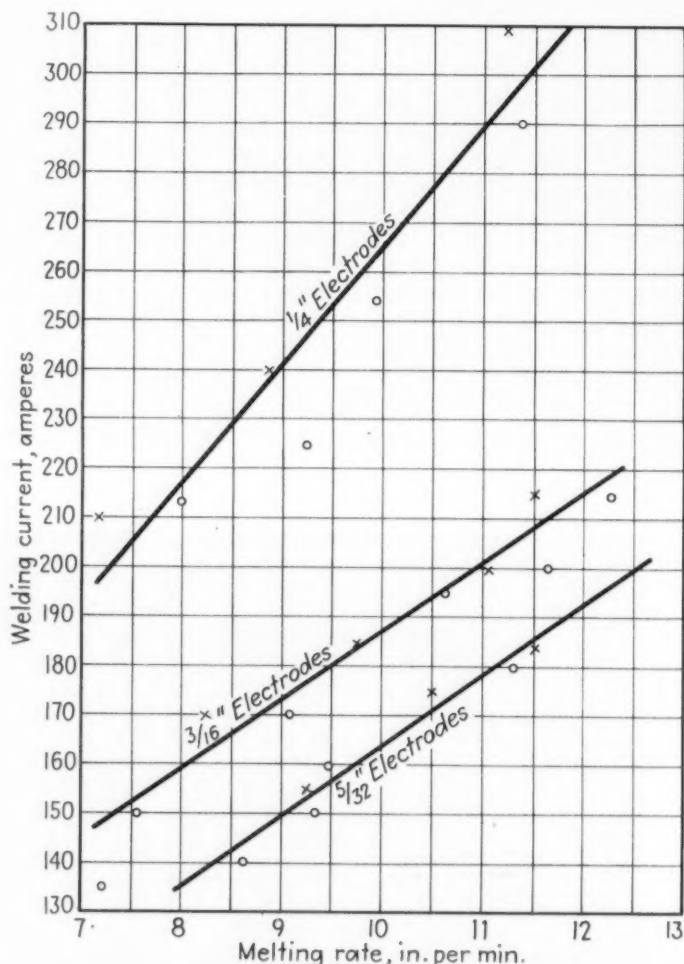


FIG. 1 — Comparison of a.c. and d.c. melting rates at same current with given electrodes. Westinghouse type DH electrodes used.

al Fabricator

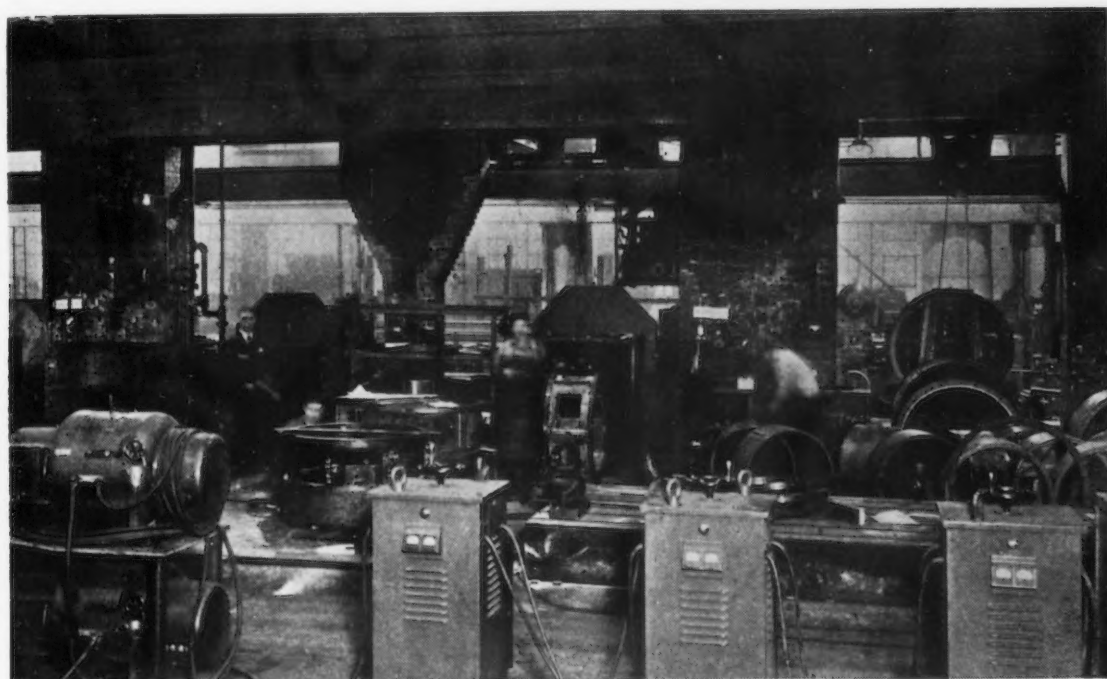
By L. D. JENNINGS

Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.



ABOVE

FIG. 3—Arc welding a motor frame using alternating current. Positioning equipment permits the operator to quickly position the work so that down hand electrodes may be used.



AT LEFT

FIG. 2—A.c. transformer type and rotating a.c. and d.c. type welding machines grouped in an arc welding shop.

efficiency but also by smaller idling loss.

All these factors—reduced first cost, less maintenance, greater operating efficiencies, and ease of operation are desirable to the fabricator, whether he is engaged in light, medium, or heavy fabrication. The individual shop owner as well as the management of large corporations is interested in welding equipment that will efficiently provide a source of welding current with a minimum expenditure of capital, and that will produce a homogeneous and good appearing weldment. The a.c. transformer type welding set possesses all of these qualities and is rapidly gaining favor in the industry.

COMPARISON OF POWER COST—300 AMP. A.C. AND D.C. WELDERS

300-amp. welders working at load voltage of 40 volts, 250 amp. 50 per cent load factor (load on half time), 8-hr. day, 20 days per month.

	300 Ampere A.C. Welder	300 Ampere D.C. Welder
Load output 250 amp. x 40 volts	10 Kw.	Motor Drive 10 Kw.
Efficiency	88 per cent	63 per cent
Input = $\frac{\text{Output}}{\text{Efficiency}}$	11.4 Kw.	15.9 Kw.
Kwhr. input per month (Kw. x 8 x 20 x 0.5)	912 Kwhr.	1270 Kwhr.
Idle time input	0.3 Kwhr.	2.56 Kwhr.
Idle time (no load) (Kwhr. input per month: idle time input x 8 x 20 x 0.5)	24 Kwhr.	204 Kwhr.
Total Kwhr. per month	936 Kwhr.	1474 Kwhr.
Power factor at 250 amp. load	55 per cent	86 per cent
Kv.-A input at 250 amp.	20.7	18.5
Saving in favor of A.C. welder per month	538 Kwhr.	

A CENTURY ago, just about the time the Whigs were at the height of their "log cabin and hard cider campaign" to elect General William H. Harrison to the presidency of the United States and a full decade and a half before the bessemer process was developed, a 21-year-old youth rented a cellar on Broad Street, not far from Arch Street, in Philadelphia, and painstakingly began the manufacture of hand saws.

The youth was Henry Disston, son of Thomas Disston, an English machinery manufacturer who immigrated to America in 1833. The rental of that cellar space by young Disston marked the founding of Henry Disston & Sons, Inc., which this year is commemorating the 100th anniversary of its founding.

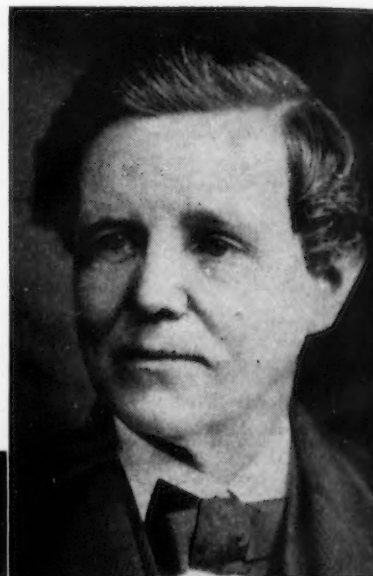
One of the features of the commemoration activities was the dedication, on May 25, of a memorial gate at the company's athletic field. Sealed into one of the gate pillars was a stainless steel box containing samples of the company's products and some promotional literature.

On the occasion of the dedicatory ceremonies, S. Horace Disston, present president of the company, discussed the plight of the older worker in industry and expressed the company's attitude as believing that a man is not "though at 40 or 50. He is just growing ripe at that age." Mr. Disston pointed out that the foreman of the company's blacksmith shop had worked for the company for 70 years and that six employees had been with the organization for 60 years, 49 for 50 years and that 25 per cent of all Disston workers have been with the company for 20 years or more.

The story of the growth of the Disston company from the humble cellar quarters of 1840 to the present plant covering 65 acres and producing upward of 5,000,000 saws and blades a year, is typical of many American industries.

A pioneering spirit, the prompt acceptance of mechanical aids for improving quality and increasing production, and the ability to persevere through numerous setbacks, were the qualities that carried Henry Disston, the founder, through the precarious early days of his endeavors to manufacture and market American-made saws

100 YEARS...



ABOVE

HENRY DISS-
TON, found-
er of Henry Dis-
ton & Sons, Inc.

o o o

AT LEFT

FIRST crucible
saw steel made
in America was
cast by Henry
Disston in 1855.



to a trade which long had displayed a preference for the imported product.

From 1840 to 1844, young Disston carried on his labors in a rented cellar. By the latter year, his activities had expanded to the point where he was enabled to lease a factory building on Front Street and Maiden Lane, Philadelphia, where there were facilities to develop and utilize mechanical devices in his manufacturing processes.

In 1849 a seemingly catastrophic boiler explosion wrecked his new quarters and he was faced with the alternatives of giving up his venture or beginning all over again. Typical of the Disston char-

acter, he chose the latter course and in a very short time had erected a new four-story plant on the site adjoining the old factory and Disston saws were soon on the market again. His decision to begin over again was quickly justified and the company enjoyed a period of rapid expansion.

Up to 1855 the saw company relied on foreign steel with its erratic composition and delivery dates as orderly as a gob of hot iron on a wet gangway. To divorce himself from this never ending source of production difficulties, and feeling that a steel source under his control would enable him to obtain steel better suited to his saw making requirements, Disston, in that year, built a steel mill and



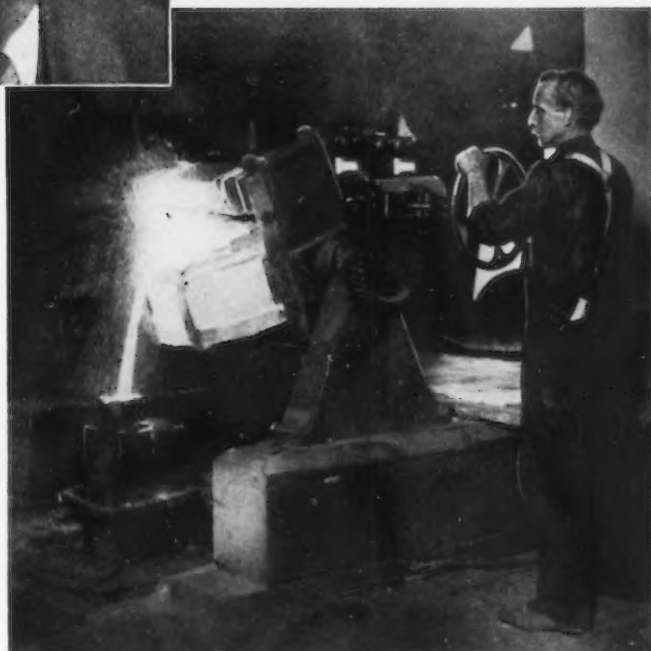
ABOVE

S. HORACE DISSTON, present president of Henry Disston & Sons, Inc.

• • •

RIGHT

IN 1906 the pioneering Henry Disston cast the first heat of electric tool steel of crucible quality in United States.



A century of fine tool manufacture is celebrated this year by Henry Disston & Sons, Inc.

cast the first crucible saw steel ever made in this country. This was also the year in which Sir Henry Bessemer announced his pneumatic method of refining steel.

The success of Disston's steel plant aided materially in developing a preference for American-made tools and the company was able to add pointing and plastering trowels, squares, bevels and mortise gages to its line.

When the Civil War broke out, the company was called upon to produce various defense equipment, as it is doing at the present time. Twenty-five employees were called to the colors and their wages were paid by the company

and their positions kept open during their service.

In 1862 a plate mill was installed and in 1864 misfortune struck again in the form of a fire which destroyed part of the works. Rebuilding was undertaken immediately and in the course of a year production was redoubled.

Hamilton Disston, eldest son of the founder, entered the business in 1865 and the company's name was altered to Henry Disston & Son. In the same year the manufacture of files was undertaken. Three years later screw drivers, brick trowels and narrow band saws were added to the company's line. These were shortly followed by wide band saws and plumbs and levels.

Albert H. Disston, another son, became associated with the company in 1871. In the same year the company purchased six acres at Tacony, Philadelphia, on the shore of the Delaware River. This ground, site of the present plant, has been continually enlarged until today it covers 275 acres on which 84 buildings have been erected.

Fire struck again in 1872, destroying the entire central portion of the plant. Late in that year the first building was erected at Tacony. The year 1874 was marked by the important introduction of the skew-back hand saw.

Over the course of the succeeding 10 years, several of the founder's sons, Horace C., William and Jacob S., followed their father's steps and became active in the business.

In 1878, with the business he founded firmly established, Henry Disston died.

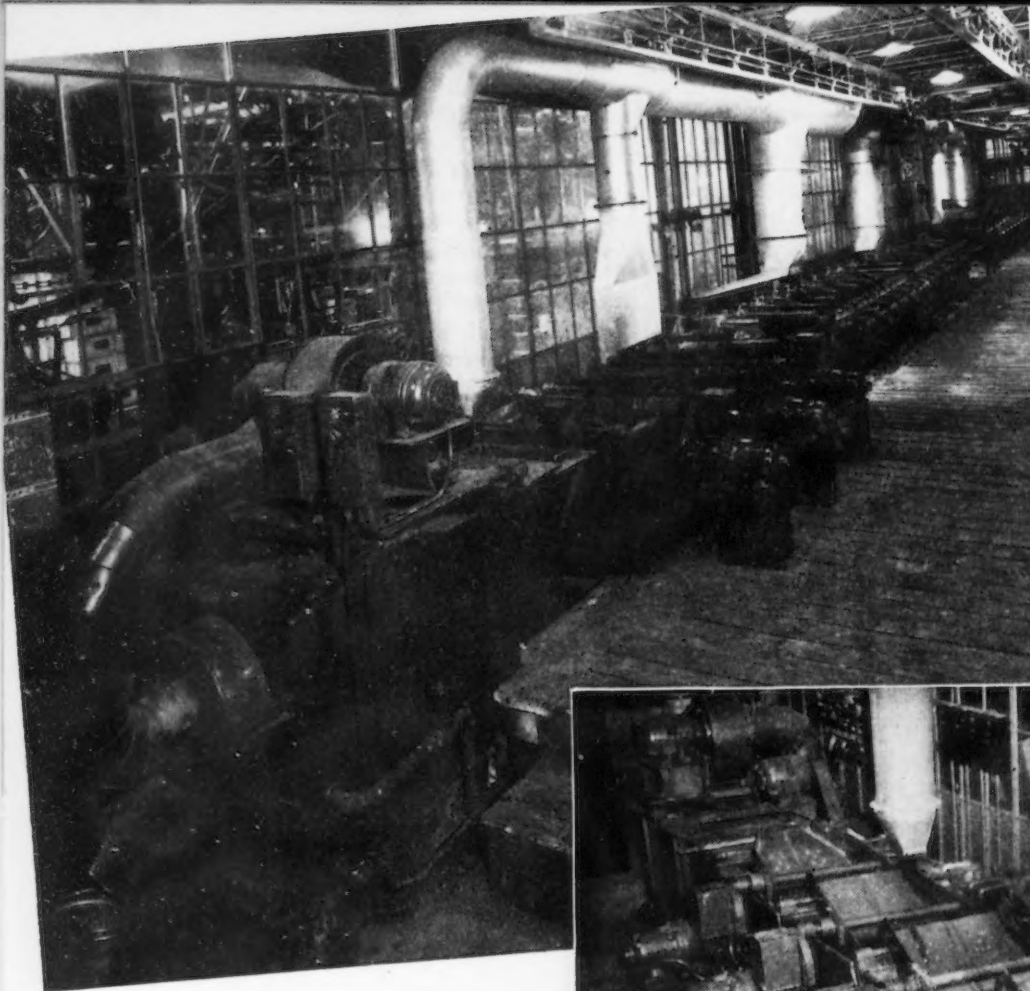
Throughout the existence of the Disston company, descendants of the founder have been active in the management of the company. The present officers of the company are Henry Disston, chairman of the board, and S. Horace Disston, president. W. S. Armstrong, R. T. Nalle, Jacob S. Disston, Jr., and W. D. Disston are vice-presidents.

William L. Disston, Jr., first of the fourth generation of the Henry Disston family, is now being trained in the plant, as were all Disston executives.

It is extremely doubtful, if the founder were alive today, that he would recognize the modern organization that has grown from his humble cellar workshop.

In addition to the Philadelphia plant, the company maintains branch factories at Toronto, Seattle, and Sydney, Australia. Sales branches are maintained at Chicago, Detroit, Boston, New Orleans, Memphis, Seattle, San Francisco, Portland, Ore., Vancouver, B. C., Sydney, Australia, and Toronto. The company's 2000 products are sold in 68 countries.

If the future may be judged by the success of the past 100 years of the company's operations, then the title of an address delivered recently by the Disston executives, "We Start on the Next 100 Years," carries a promise that may well be achieved.

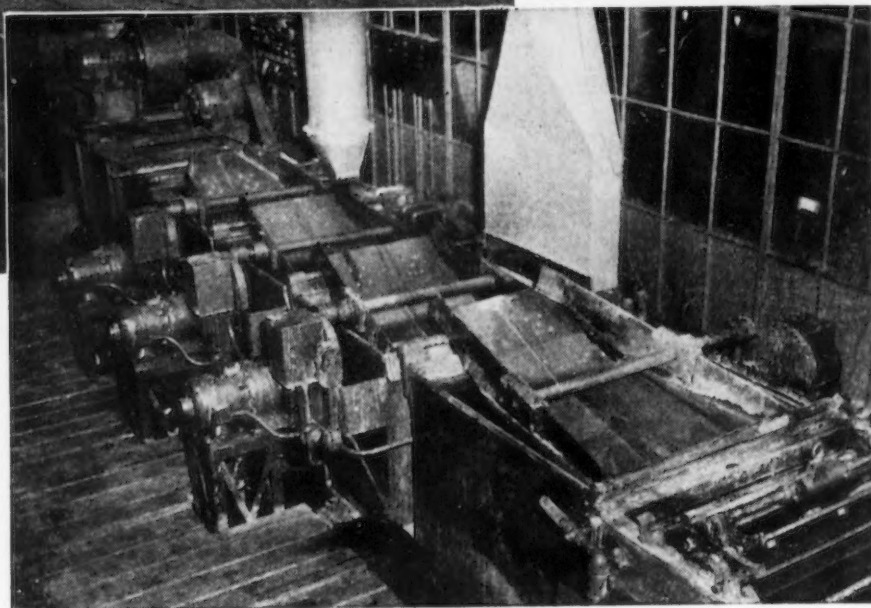


(LEFT)

GENERAL view of the new Hanson-Van Winkle-Munning hopper type barrel plating installation at the Chrysler-Plymouth plant in Detroit, seen from the dryer end of the line. The battery of plating cylinders is under the third and fourth exhaust stacks from the left.

(BELOW)

VIEW of the line of four semi-automatic rinsing hoppers for sequencing rinsing operations following barrel zinc plating. One of the plating barrels may be seen at the extreme right, and rinsing progresses to the left, from hopper to hopper.



High Speed Zinc Plating

• • •

IN a new installation of a hopper-type barrel plating made at the Chrysler-Plymouth plant in Detroit by the Hanson-Van Winkle-Munning Co., Matawan, N. J., a variety of small parts are zinc plated at a production rate of 3000 to 4000 lb. of work per hr. At present seven men are required on this plating line, although it is estimated that with a slight change this force can be reduced to five.

At the head of the line one man shovels work into a 14x30-in. Monel metal cylinder which is carried through the cleaning cycle by a second man who operates the hoist. This cycle consists of revolving the cylinder in hot caustic cleaner for about 5 min.; revolving in a cold rinse, revolving in 15 per cent sulphuric acid from 3 to 10 min., depending upon thickness of scale; revolving in a cyanide rinse for 1 min. and finally dumping the work into the plating barrel loading hopper.

The third man takes care of loading the plating barrel and lowering it into the cyanide zinc solution, where the barrel is rotated for 20 min. About 300 amp. passes through each barrel, which holds from 75 to 200 lb. of work at a time, depending upon the size and shape of the parts. Owing to the volume of work handled, there are 12 plating cylinders in operation and two men serve the two sets of tanks.

Rinsing after plating is handled through the semi-automatic hoppers. Work is dumped into hopper No. 1 for a cold rinse, then into the second hopper for a hot rinse, into the third hopper for an 8-sec. sodium dichromate dip and finally into the fourth hopper for a hot water rinse. From here the work is dumped from the last hopper into a dryer. One man controls the cycling of the hoppers and the seventh man is at the dryer.

Each hopper requires approximately 55 sec. to make a cycle from the time the motor starting button is pushed, dipping the hopper into the tank, until the hopper returns to its original position. It then takes 20 sec. to dump the work into the next hopper. To take a hopper load through the whole series requires 3 2/3 min., although one hopper load is deposited into the dryer every 110 sec., provided the hoppers are loaded continuously.

What's New in Finishing Apparatus

By FRANK J. OLIVER
Associate Editor, *The Iron Age*

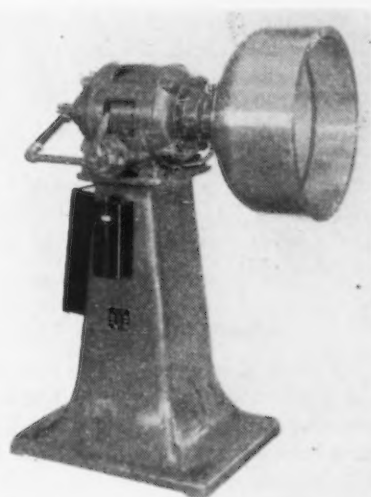
NOW standard equipment on all Packer-Matic automatic polishing and buffing machines, but applicable as well to all types of buffing machines and stands is a new electric automatic composition applicator, made by the *Packer Machine Co.*, Meriden, Conn. The motorized unit imparts a smooth rocking motion of the composition cake to the buffing wheel and by this regular application gives definite savings in composition cost. Time of reloading cakes is greatly reduced through the use of cakes



longer than the usual commercial length and up to 8 in. wide, or the full wheel face. Through a reduction unit and cam, a 1/20 hp. motor brings the composition to the wheel 12 times per min. and another adjustable cam advances the cake on the parallel link rocking frame to compensate for cake wear. There is also provision to adjust for wheel wear. The standard applicator bracket furnished with Packer-Matic polishing and buffing machines permits the setting of the electric applicator in any position around the periphery of the wheel.

STARTING with descriptions of new advances in polishing equipment, this review of recent announcements describes portable sanders, spray nozzles for metal cleaning operations, spray gun equipment and accessories, plating auxiliaries, and a new type of portable infra-red lamp reflector bank. Several companies have developed finishes especially formulated for baking with these radiant heat lamps and a number of new finishes have been placed on the market for specific application to various metal products.

tem brings the spindles to rest in 2 sec. at high speed. Application of vacuum chucking is said to have re-



Speed Lathes with Vacuum Chucks

SPECIALLY designed vacuum holding chucks are being employed on a battery of speed lathes recently built for grinding and polishing a variety of shapes and sizes of work in a plant manufacturing cream separator parts, ranging from small cups, plates and disks to large stainless steel bowls. The lathes were supplied by the *Schauer Machine Co.*, 2066 Reading Road, Cincinnati, with single or two speed motors of 1 and 2 hp., depending upon the work to be handled. An automatic braking sys-

sulted in higher production, improved quality, elimination of spoilage and increased safety to the operator. It is the simplest and most positive means of holding such pieces against rotation or release. Both the inside and outside surfaces of the same piece are polished on one lathe.

Polishing Lathe

LATEST in the line of polishing and buffing lathes made by the *Divine Brothers Co.*, Utica, N. Y., is the type VCS illustrated available in 3, 5 and 7½ hp. ratings. These



machines are V-belt driven from open type squirrel cage, ball bearing motors, inclosed in the base but readily accessible through the removable tray, ordinarily used to hold composition and small tools. Two self-aligning bearings are used on the spindle, which is oversize to prevent whip from belt tension and springing from work loads. Spindle diameter between flanges is standard at $1\frac{1}{4}$ in. but can be supplied up to $1\frac{3}{4}$ in. Wheels are 40 in. from center to center and the spindle centerline is 38 in. from the floor on the standard units. Starter is mounted on a pipe stand at rear of machine. A mechanical push button type is supplied on all sizes of 440-volt lathes and a magnetic push button type on $7\frac{1}{2}$ -hp., 220-volt lathes. Sheave sizes can be selected to give desired spindle speeds.

Wire Wheel Brush

EXTRA density of wire for any given width of brush is featured in a new group of high quality wire wheel brushes developed by *Van Dorn*



Electric Tools, Towson, Md. These brushes are made in six diameters, from 4 to 12 in., in three thicknesses for each diameter and in either coarse or fine wire. The coarse wire is suited for cleaning castings, removing

scale and other heavy duty cleaning and burnishing operations, while the fine wire is best adapted to work on aluminum, brass, molds, buffing and finishing. In these brushes, individual tufts of wire containing many strands, are inserted under curved fingers which are driven down against the body of the washer. The individual tufts fan out to present an even, solid brushing surface of extra density.

Portable Belt Sander

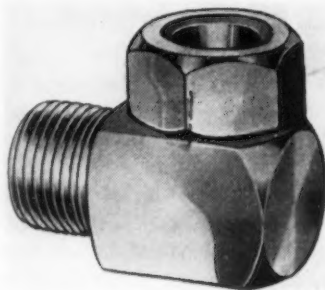
STANDARD abrasive belts can be used on the new type G-3 portable electric Guildsander, made by the *Syracuse GuildTool Co.*, Syracuse, N. Y. A $\frac{1}{2}$ -hp. universal motor operating on 110 volts is used to drive



the belt at 1350 ft. per min. All moving parts, including the drive and idler pulleys, are mounted on precision ball bearings. Such features as the belt aligning control and quick change belt latch are retained. Frame is a cast aluminum alloy to reduce the weight, which is 15 lb.

Spraying Nozzles

FOR use in metal cleaning processing and other industrial application, a non-clogging centrifugal



spray nozzle with unusually large orifice has been developed by the *Spraying Systems Co.*, 4021-P W. Lake Street, Chicago. Nozzle is of the Whirljet type, with a 45 deg. included spray angle and a capacity of 2.3 gal. per min. at 10 lb. pressure. Construction is sturdy, with smoothly rounded large passages and $\frac{3}{8}$ in.

male pipe connection. Standard stock construction is 18-8 stainless steel. A similar nozzle with a square spray is also available in brass.

Another new product of the *Spraying Systems Co.*, is a flat air nozzle, to be used wherever a flat, wide stream of air with uniform distribution is required, such as for drying after washing in metal cleaning operations. Nozzles of this type are available in capacities from 2 to 7 cu. ft. of air per min. at 50 lb. pressure. Standard stock construction is brass, with monel metal strainer (optional). Made in $\frac{1}{4}$ and $\frac{3}{8}$ in. male or female pipe connection.

Portable Electric Sander

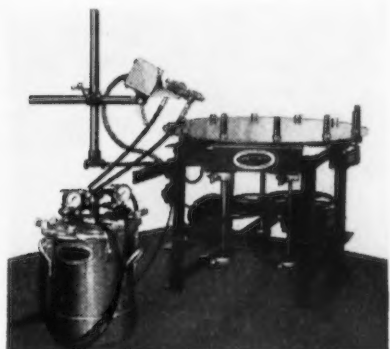
IMPROVED drive mechanism, increased power, positive lubrication and balancing of the entire unit are some of the improvements found on the 1940 model Easy electric sander, announced by the *Detroit Surfacing Machine Co.*, 7433 W. Davison Avenue, Detroit. The reciprocating action of the tool is said to duplicate the



natural back and forth motion used in hand finishing. Power is furnished by a special universal motor, available in 110 and 220 volt models and equipped with grease-sealed ball bearings. Motor is fan cooled and incorporates a filter to remove injurious dust and grit. An improved type of holder is used to hold the abrasive paper (one-third standard size) tightly on the sanding pad, thus eliminating loss of cutting action. From one to several pieces of abrasive can be attached at one time. Weight of sander is $6\frac{1}{2}$ lb.

Automatic Tube Sprayer

THE Eclipse Air Brush Co., 396 Park Avenue, Newark, N. J., has built an automatic sprayer to coat the inside and outside of steel tubes, 4 in. long and with an inside diameter

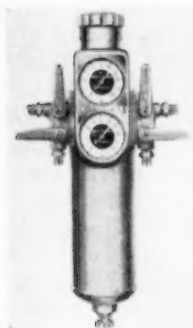


of 1 in. The tubes are placed in an upright position on a turntable which automatically rotates them as they pass in front of a solenoid operated spray gun, synchronized with the action of the turntable.

For coating the insides of the tubes, they are set into a holder on a stationary table, and a treadle operated spray gun is used. The setting and removing of the tubes in both instances are manual operations. Production of this work is 1200 per hour for each operation.

Air Regulator for Spray Guns

GREATLY increased capacity, improved filtering facilities, and more sensitive regulation and control of pressure are featured in the type HLC air transformer, supplied by the DeVilbiss Co., Toledo, for feeding clean, moisture-free air at uniform pressure to spray guns. It handles in excess of 50 cu. ft. of air per min. with a minimum of pressure drop, and will pass air sufficient for two production spray guns continuously or three spray guns in ordinary, intermittent use. Features include a large synthetic rubber regulator diaphragm, refined operating mechanism and a conveniently located regulator knob of large size. Thorough



condensation is afforded by an extra large condensing chamber. Filtering is done through a metal filter, after initial air cleaning is effected by an improved baffle arrangement. Gages indicate air line pressure and regulated pressure.

Fire Extinguishers

TWO new pump type fire extinguishers of 1 and 2-gal. size have been placed on the market by the Buffalo Fire Appliance Co., Buffalo, especially for use around paint spray booths and large electric motors. These CTC extinguishers are of the carbon tetrachloride vaporizing type. Pump is double acting and throws a continuous stream from 25 to 30 ft. The stream stops when pumping stops and there are no outside valves in the units. Shell is made of heavy drawn seamless brass and top and bottom sections are red brass castings.



Insulating Steam Joint

SAID to be fully adequate for all of the normal conditions of acid and other chemical handling equipment in the new hose type of insulating steam joint, developed by the



Hanson-Van Winkle-Munning Co., Matawan, N. J. The joint consists of a special seamless rubber tube, compounded to resist steam and heat, and covered with plies of strong, closely woven duck. Between these plies are placed layers of insulating rubber and a heavy gage cover is placed on the outside. Each joint is 8 in. long and is built to withstand 100 lb. steam pressure. It comes equipped with hose clamp on each end for attaching to standard size steam pipe.

Aluminum Cleaner

ESPECIALLY compounded to prevent corrosion of non-ferrous metals when cleaned is a new aluminum cleaner, Cowles AE, manufactured by the Cowles Detergent Co., 7016 Euclid Avenue, Cleveland. With

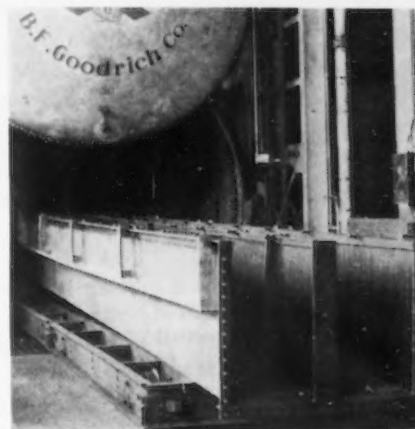
this mildly alkaline cleaner, mirror finished surfaces of aluminum are not affected by one hour exposure to this cleanser in concentrations as high as 6 oz. per gal. at boiling, it is claimed. The cleaner is customarily used in concentrations of 3 to 6 oz. per gal. of hot water. It is compounded to produce in solution the high colloidal activity and proper balance of detergent anions necessary for effective and safe cleaning of aluminum parts from accumulations of shop dirt, and drawing and cutting oils. Cleaned parts rinse freely.

Protective Primer

RUST or iron oxide on steel is utilized as a protective pigment with the protective primer, known as Penetrol, made by the Flood Co., 6217 Carnegie Avenue, Cleveland. Penetration of this medium into all pits and surface pores insulates any rust present from the base metal and prevents any further electrolytic action. Claims made for Penetrol are that it forms an impermeable film which dries hard all the way through and gives perfect adherence to the metal. The film is elastic, resistant to abrasion and presents a surface to which exposure paint coatings will readily adhere. Clear Penetrol is applied to rusty steel until the rust is saturated and is allowed to dry 48 hrs. before a paint coat is applied. It can be applied equally well on new steel. Penetrol can be used as a thinner or reinforcing reducer for the exposure coat, adding to its elasticity and life. It is said to be particularly effective as a vehicle for aluminum paint, leveling out readily without brush marks and without orange peel when sprayed.

Rubber Tank Lining

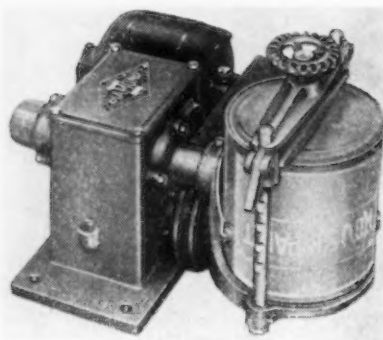
FIELD tests indicate that Goodrich Triflex K rubber tank lining originally developed for bright nickel



plating is equally satisfactory for high speed, bright copper plating. The lining is found to be non-contaminating and completely resistant to the corrosive effects of copper plating solutions. Triflex K is a special adaptation of the three-ply lining construction introduced by the *B. F. Goodrich Co.*, nine years ago for lining heavy duty pickling tanks in the steel industry. It comprises a layer of hard rubber cushioned between two layers of softer rubber, the three plies being vulcanized together to form an integral structure. Adjacent sheets are overlapped to form expansion joints in which the hard rubber layers are separated. The illustration shows a section of a Triflex K rubber lined tank for an automatic electroplating installation, seen emerging from a vulcanizer cylinder.

Paint Conditioner

A NEW paint conditioner built in two sizes, one for cans or buckets up to 1 gal., the other from 2 to 5 gal., has been announced by the *Diamond Iron Works, Inc.*, Minneapolis. These mixers operate on a re-



verse action principle, breaking up circulating currents by creating a strong slushing effect so that the paint is thoroughly conditioned regardless of the time it has been in stock. The motion mechanism is totally inclosed. Mixer is designed with shaft extensions on both sides so that it can be converted into a two arm conditioner if desired. The clamp mechanism is adjustable for the smallest can, or a number of cans can be stacked under the clamp bar. Drive is roller bearing equipped.

Infra-Red Finishes

A NEWLY developed line of finishes especially formulated for use with infra-red baking equipment is announced by *Ault & Wiborg Corp.*, 75 Varick Street, New York. These formulations include both undercoats—primers and primer surfaces—and

topcoats in a full range of plain colors, with no limitation as to lustre. A hammered effect and wrinkle finishes are also available. Polymerin-100, a low-baked finish, is included in the series. Polymerin infra-red finishes are being used successfully in a variety of industries, it is reported, on household appliances, automobile parts, cabinets, enclosures, etc. Speed schedules are being greatly reduced. A storage file, for example, which will ordinarily bake for 15 min. at 300 deg. F. with polymerin, is being baked in an infra-red lamp set-up in 5 min. The speed-up made possible by specially designed A & W finishes used in an automobile plant resulted in a 30 per cent saving in light costs, it is claimed.

Infra-Red Enamels

TWO new lines of enamels, especially designed to work at high speed baking schedules in infra-red lamp (radiant heat) ovens, are announced by *Maas & Waldstein Co.*, 438 Riverside Avenue, Newark, N. J. The two new lines are Raydur synthetic baking enamels and Raydur Duart wrinkle enamels. With infra-red heat, both will bake a very hard, durable surface in 15 to 20 min. and can be handled for assembly half an hour later. The color retention is good, and the adhesion on various metals and molded bakelite is said to be excellent. Raydur baking enamel can be supplied in high gloss and semi-gloss finishes and Raydur Duart wrinkle enamel in grades to form fine, medium and coarse patterns.

Clear Lacquer

ANOTHER product of *Maas & Waldstein Co.*, Newark, N. J., is a new type of clear lacquer especially developed to resist the corrosive action of perspiration. Said to furnish excellent protection for both finished metal surfaces and undercoats of lacquer enamel, the material is suitable for articles frequently handled, such as flashlights, pencils, compacts, etc. It is light in color and has good outside weather resistance, adhesion and color retention. It is supplied in either high gloss or flat finish.

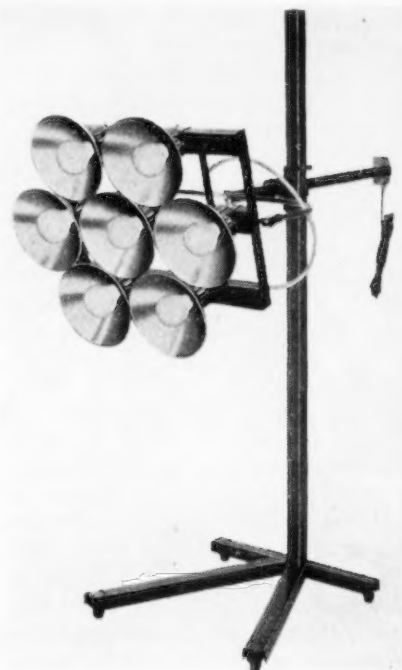
Metal Protective Coating

MICCROLAC is the name given to a new coating material to be used to protect metal surfaces of either natural or plated finishes. Its color approximates distilled water and it dries to a high lustre. It is said

to offer excellent qualities of adhesion, flexibility and abrasion resistance. The type of coat applied for ordinary decorative work dries in a few seconds time. Microlac, according to the maker, the *Michigan Chrome Co.*, 6340 E. Jefferson Avenue, Detroit, is highly resistant to sulphur dioxide, sunlight, moisture, oil, grease, gasoline and all commonly known chemical fumes. The material does not blush even in the most humid weather, it is claimed. The material is applied either by dipping or spraying.

Infra-Red Reflector Bank

INFRA-RED baking and drying lamps are coming into wider use because of the shorter drying time involved, less space and lower investment required and decreased spoilage of work. Except on small spot work, a flat bank of no less than seven reflectors are generally needed to provide the proper intensity and distribution of energy. In its model P-7-IR portable, flexible reflector bank, the *Fostoria Pressed Steel Corp.*, Fos-



toria, Ohio, is offering such a unit for infra-red baking and drying "touch up" work on automobiles, trucks, office equipment, furniture, doors and similar products that cannot be put through regular production equipment. The bank of seven Para-Sphere reflectors, gold plated, will handle areas up to approximately 30 in. in diameter, and can be instantly adjusted to any bank position desired and to a height from 18 to 72 in. The stand is mounted on four casters for maneuverability.

TEST AFTER TEST

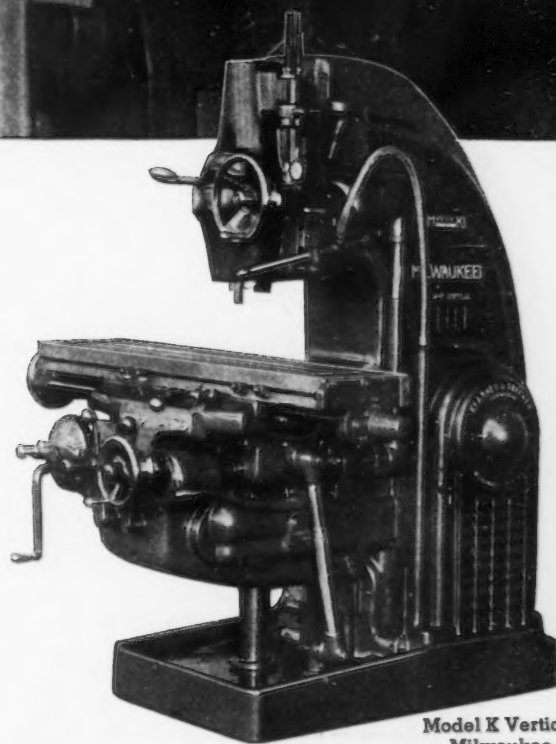
...TO MAINTAIN
MILWAUKEE QUALITY



TEST after test — severe and exacting — determines the fitness of every item of material and workmanship in a Milwaukee Milling Machine.

A large staff of highly trained technical men is concerned solely with the constant testing, checking and inspection—at every stage of manufacture—that safeguards Milwaukee quality and performance-accuracy.

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Model K Vertical
Milwaukee

Milwaukee **MILLING
MACHINES**

DETROIT—A realistic approach to problems of defense production is what was expected when William S. Knudsen undertook the responsibilities of production chief of the National Defense Advisory Commission. The country has not been disappointed in its expectations, and is beginning to get the real measure of the man.

The automobile industry finds particular reasons for satisfaction in the contents of Mr. Knudsen's most recent progress report (*THE IRON AGE*, Aug. 1, p. 80) with its assurance that there will be no cessation of regular output of automobiles unless extreme conditions force it. The auto industry has stood firm on the premise that our continued economic well-being depends greatly on our ability to continue normal production of goods and has urged that auto production should continue undisturbed, as far as possible, during the filling of defense orders. It had been generally understood, however, that War Department plans called for the conversion of large parts of the industry to airplane and munitions manufacturing.

Industry objections were based not only on an unwillingness to disband commercial activities unnecessarily, but on the very practical knowledge of the futility of trying to convert its equipment to jobs for which such equipment was not designed. Knudsen, knowing this because of his years as a production executive in the industry, has apparently been the important factor in causing a revision of the plans. The industry has maintained that the most practical course is to direct the defense efforts of the industry into channels where they will prove the most effective. That, in essence, is what is going on now.

Ordnance Work in Pre-Production Stage

NO less than a dozen vital military projects are in the hands of engineers in major automobile plants today—all of them headed toward a solution that is certain to mean eventual mass production. Two groups, one at Chrysler and one at General Motors, are concentrating on the redesign of medium-weight tanks which are being changed considerably from previous designs in the light of recent European experience. Machine guns, armored motorcycles, shells and a variety of military goods are in pre-production stages.

Significant, and certainly an item for the record, is the fact that most of this work is being done on a voluntary cooperative basis. There are no contracts to authorize this work in most instances; instead the industry has undertaken to supply deficiencies and work with the War Department in designing much-

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• Automobile industry finds satisfaction in William S. Knudsen's assurance that national defense work need not interfere with regular production of cars and trucks... Ford going ahead with plans for V-12 type airplane engine

needed new equipment, or redraft the obsolete designs as suggested by the Army. The fullness of this cooperation, when it is revealed, will confound the critics, some of whom have made the assumption that the industry's lack of orders right now is an indication of balkiness or hesitancy over questions of amortization, etc.

Henry Ford has confirmed earlier reports that his engineers have gone ahead with plans for a high-output aircraft engine. In the blueprint stages, and apparently still some distance from the time when a tooling program might be started, the proposed engine is a V-12 which will develop about 1500 hp. at 3000 r.p.m. Aside from authenticating the existing information, Ford representatives are supplying very little extra information.

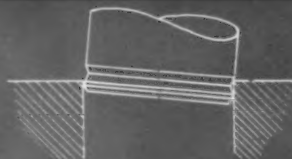
Broadly speaking, the position of the automobile manufacturer in the airplane engine field does not appear to be a comfortable one. Precision requirements, plus the unwillingness of the Army, Navy and Civil Aeronautics Authority to accept "matched fits" instead of exact ones, cause some headaches. However, the demand for surfaces free from even minor blemishes is the big bogie which the auto people are trying to overcome. The Allison engine is being watched by many here, since it is known that precisely these difficulties are being met at the Allison plant and at Cadillac, where some of the parts for Allison are being made. No word of objection comes from Allison, but it has been learned that research engineers are studying the problem from every angle. Effects of flaws are being investigated painstakingly by means of tests-to-destruction on many parts. Some good, for the aircraft engine industry as well as the auto industry, must eventually come out of the volumes of data being accumulated.

May Modify Allowable Stresses

AMARINE engine producer in the medium-power range is preparing to run tests to compare machined-all-over connecting rods with unfinished forged rods. It is this producer's guess, at this stage, that allowable stresses in rods can be modified enough to permit satisfactory use of the rod without machining and polishing every surface. Hand work on some of these rods amounts to about 8 hr. per rod at present.

All the industry can do is wait and see—but it is frankly curious about the repeated rumor that James Farley will head an automobile company this fall. A year ago, Farley was said to be in line for the presidency of the then-defunct Pierce-Arrow company. Little credence was given that rumor, because large

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"PILOT" CYLINDRICAL PLUG GAGES



HOW would you like a cylindrical plug gage that finds its own way into the hole? A gage that never jams . . . that turns an unskilled operator into an expert . . . that lets you use *full* tolerance by getting into even the tightest okay hole . . . that checks with utmost speed and accuracy, and kills *all* uncertainty in the minds of operators and inspectors?

Too good to be true? We thought so too, at first. But there *is* such a gage, priced only fractionally higher than standard types, and assuring you important savings in time, temper, and *money*. It's the new "Pilot" Cylindrical Plug Gage — remarkably simple and effective.

"Pilot" is like an ordinary gage except for its chamfered end, annular groove, and the land between. This lets it enter easily, center itself, line up, and go on in. Photos show ease of entry even with only .0001" clearance. Write for complete details.

PRATT & WHITNEY
DIVISION NILES-BEMENT-POND CO.
West Hartford, Connecticut, U.S.A.

portions of the Pierce-Arrow plant equipment had already been sold, and the rest of it was on the block at the time that the rumor was going the rounds. Ever since the Democratic convention last month there has been a new rumor linking Farley with Willys-Overland, which, by the way, is affiliated with the Empire Ordnance Corp. and is expecting to fill sub-contracts for Empire. Willys, however, has denied that Farley will be associated with the company.

The Willys-Farley story was made complete, and even more interesting to Detroit, by linking to it another famous name. Theodore F. MacManus, advertising man who grew up with the auto industry and wrote the famous Cadillac ad, "The Penalty of Leadership," has formed a new advertising agency and announced that he will handle a program for one of the major automobile companies this fall. The matter is of enough import locally to keep everyone in the industry guessing, so MacManus' name has been added to the Willys-Farley combination. Such a tie-up, it is reasoned here,

might materially change Willys' relative position in the industry.

Buick Expansion Completed

READY to resume production and begin building 1941 automobiles, Buick late last week announced completion of another major expansion and tooling program that has involved extensive changes and improvements in virtually every manufacturing department. Productive capacity in Buick plants now is up to 1500 units a day or 350,000 cars annually, according to Harlow H. Curtice, president and general manager, against a capacity of approximately 1300 cars a day in the model year just ended.

Buick now is equipped to meet expected expanded market requirements for new cars and at the same time answer any calls made on it in the national defense program, Mr. Curtice said. In this connection, he disclosed that Buick engineers have been working closely with Army technicians on an adaptation of the Buick valve-in-head engine for military uses. As men-

tioned in *THE IRON AGE* of June 6 (P. 80) the engine is favorably regarded for light tank application, probably "suped up" to give greater power. However, other armament production also is being considered, Mr. Curtice said.

The model year just finished saw production of a total of 283,204 cars, he said. This is a new all-time high for Buick, the previous high having been in 1927 when 250,116 cars were built. Production of 1940 models required two shifts continuously, with a skeleton third shift. Employment of 15,800 men was practically without fluctuation and this force averaged 2050 hours per man for the model year just ended. Incidentally, the industry average wage is better than a dollar an hour.

Continuing its practice of staggering inventory periods and departmental shutdowns for model changeovers, the company has maintained employment during these brief periods above the 9000 mark.

The general increase in productivity has meant addition of all kinds of plant equipment in every department. Design changes in the cars further increased the need for new equipment. Among major construction projects were expansion in the sheet metal department, involving construction of a large plant addition and extensive rearrangement of machinery, a new axle plant, removal of gear manufacturing to a new building, and a new manufacturing layout for production of connecting rods. Additions were also made to the foundry, forge, transmission and final assembly plants, shipping and receiving docks and materials handling facilities.

The "car of the dim distant past" and the "car of the future" were in Detroit last week as part of the promotion of the Flint Motor Festival. The ancient car, a 1910 Buick bug, built by Louis Chevrolet and Bob Burman, barnstormed the country 30 years ago and was raced at speeds up to 90.9 miles per hr. It was reconditioned by Buick's chief engineer, Charles A. Chayne, who added one noteworthy modern touch—a self starter. The futuristic car is one especially built by Harley J. Earl, of the GM art and color department, the styling section of the company.

PLANT CHANGEOVERS FOR PRODUCTION of 1941 model automobiles are taking place throughout the industry. Here in the Pontiac plant layout department engineers play "chess" with pieces of cardboard representing equipment in the plants; their work was a preliminary to the actual moving of hundreds of tons of machines and other equipment before production lines were started up to turn out a new series of automobiles.



MORE From Your Present Production Set-Up!

It *can* be done—is being done in well over a thousand plants. Men are discovering this new way to get *more* from present production set-ups.

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These modern tool steels reduce the number of times machines and presses must be shut down to redress, regrind, or replace tools. Send for the new booklet that shows how improved tool and die performance can help you get *more* from your present production set-up.



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14.5 more productive hours per press per month on finish drawing 18-8 Stainless Steel watch cases.

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42 more productive hours per month per press on drawing a bearing retainer.

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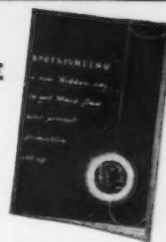
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THE IRON AGE, August 8, 1940—51

WASHINGTON — The Justice Department's anti-trust enforcement policy is giving members of the National Defense Advisory Commission a major headache, almost ranking in severity with the defense program's current affliction—amortization, the sore spot for every potential contractor of large defense orders.

So concerned were industry representatives on the defense commission last week over the Justice Department's announced anti-trust move against 22 major oil companies that they are known to have laid virtually all other business aside, hoping to facilitate rather than discourage cooperation in the defense program, and to forestall any developments which could be interpreted as government hostility toward business.

In seeking a clarification of the government's anti-trust policy during the months ahead, the commission's number one problem child is Assistant Attorney General Thurman Arnold, energetic head of the Justice Department's anti-trust division. Mr. Arnold, who still takes time out from his trust busting duties to lecture Yale law school students on anti-trust procedure, has enjoyed marked success in injecting new life in the Sherman Act, and within the past six weeks has instituted anti-monopoly actions against the Pullman Co. and its affiliated companies and against eight major tobacco concerns.

Arnold Asked to Defer Suits

The Assistant Attorney General sent word out on July 29 that a civil action against 22 oil companies, intended to separate control of oil pipe lines and marketing of oil products, was next in line.

Defense commission members then stepped in and asked Mr. Arnold to defer his suit pending an investigation by them to determine the possible impact of the action on the defense program. Presumably, they based their decision to intervene on assurances previously given by the Justice Department that it would raise no question of anti-trust violation in cases where the commission recommended that some particular procedure was necessary in the interest of national defense. It is understood that in the pending controversy, the commission considers it highly advisable to throw no government hazards in the way of constructing gasoline pipe lines from areas in the Gulf Coast to points in the Carolinas on the Eastern seaboard.

In making these previous overtures to the law enforcement arm of the government, members of the defense commission had in mind, for example, the rec-



• National Defense Advisory Commission upset over Assistant Attorney General Thurman Arnold's anti-trust activities at a time when industry cooperation is sought for defense program . . . Arnold asked to defer his suit against 22 oil companies

ommendations of Bernard M. Baruch, chairman of the War Industries Board during the World War, and others who favor giving the President emergency power to suspend the anti-trust laws as a means of speeding production for defense. Rather than run the risk of seeking legislation to put the anti-trust laws on ice for the duration of the emergency — a step that would invite a renewal of the old controversy surrounding the ill-fated NRA—commission members sought and obtained a gentlemen's agreement from the Justice Department high command.

The catch is that, while the scheme is designed to maintain industrial morale at a high level and appears imposing enough on paper, actually there are but few occasions where the

defense issue is expected to be a factor tending toward relaxation of the anti-monopoly laws. Mr. Arnold told THE IRON AGE that he can foresee few occasions where the defense issue could arise, but he pointed out, however, that if it can be demonstrated by the commission that defense is a factor worthy of consideration, that a particular anti-trust action does threaten to interfere with the preparedness program, his department, while possessing no authority to waive the law, can invoke the policy laid down in several Supreme Court decisions during the World War that a combination ordinarily in restraint of trade is no violation of the Sherman Act if the combination is dictated by the necessities of defense. In other words, the view is taken, based on these decisions, that an interference with free competition certified as essential to the national defense is actually not an unreasonable restraint of trade.

But Mr. Arnold wants to be shown. If a contemplated step involves pricing policy or allocation of production, Mr. Arnold is ready, willing and able to scrutinize the move upon the recommendation of the defense commission. But he sees little chance for wholesale relaxation of enforcement procedure when some 90 or 95 per cent of the activities of the anti-trust division have no relation to national defense. In the current oil case, he thinks the defense agency is stretching a point in introducing the defense angle.

Monopoly Allegations a Test Case

The action against the oil companies is viewed with interest by industry generally because it represents the first test case to come up since completion of the defense commission's understanding with Mr. Arnold's anti-trust division and because it embodies allegations of monopoly against 22 oil companies which, with the

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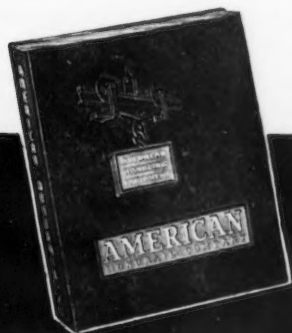
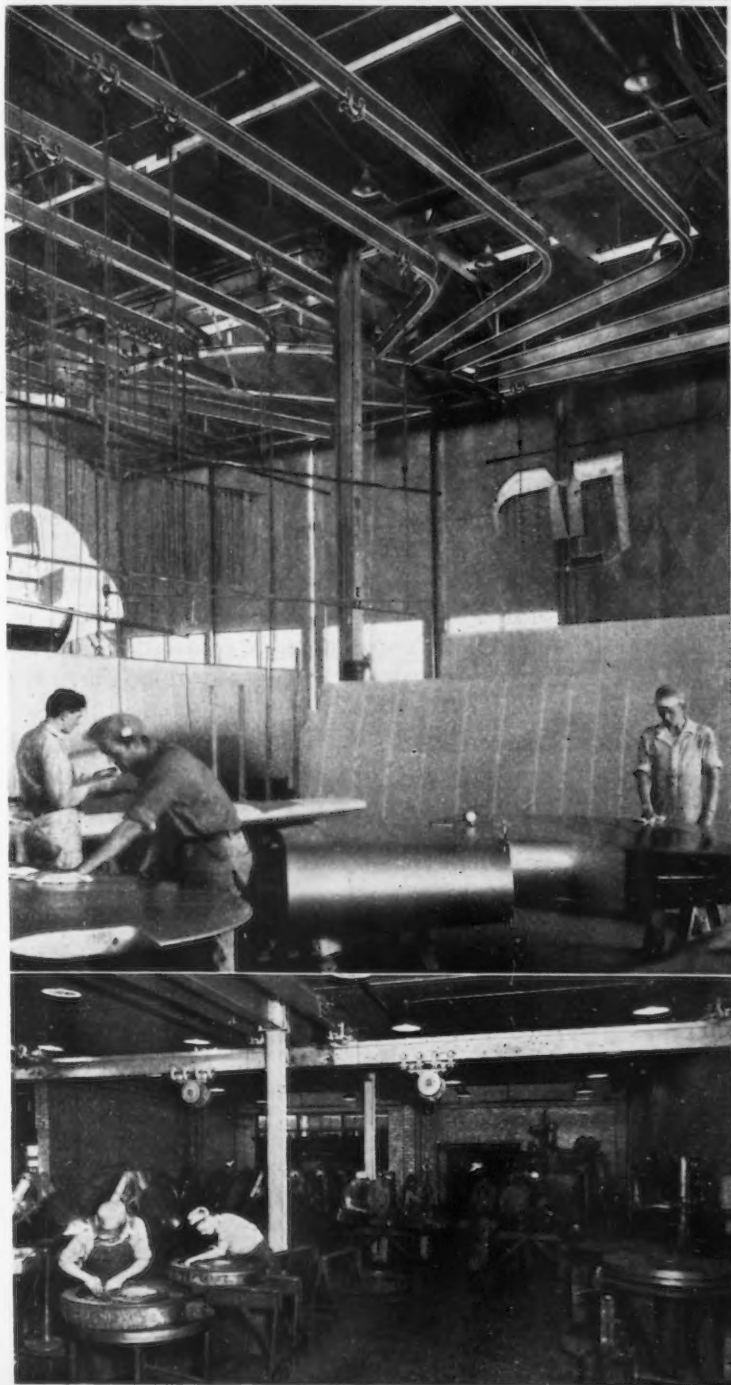
Loads are proportioned equally with process capacity—

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Materials and products kept on scheduled routes free from congestion or damage in transit.

Maximum return from skilled wages is therefore obtained only with a carefully planned handling system. Many such installations of American MonoRail show immediate savings large enough to pay their cost within a short time. Write for a copy of 254 page book illustrating hundreds of applications.

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Approval in one case, Justice officials point out, will not establish a precedent for another, the procedure being to weigh each case on its individual merits. Moreover, industry representatives whose program is approved will be exempt from criminal prosecution but not from injunction proceedings if in

Meanwhile, the defense melting pot continues to boil. Business representatives are thinking in terms of removing obstacles in the way of production. Treasury Department experts are appraising the outlook for tax revenue. Mr. Arnold continues to needle industry despite the defense program, and Leon Henderson, price expert on the defense commission, has his cyclopean eye peeled on possible "inflationary spirals."

After being urged by commission members, Edward R. Stettinius and William S. Knudsen, to authorize additional power producing facilities for the Tennessee Valley Authority to cost an ultimate \$65,-800,000, Congress stamps its approval on a bill expected to provide an estimated additional 298,000 kw. of TVA power, of which a substantial bloc will be taken by the Aluminum Co. of America to step up its output of aluminum sheets for aircraft construction. The Aluminum company, which maintains its

National defense makes strange bedfellows.

The statement from Duluth by M. J. Gormley, executive assistant of the Association of American Railroads, that estimates of huge railroad equipment purchases for defense are exaggerations, was described this week as coinciding with the view of Ralph Budd, transportation member of the National Defense Advisory Commission and president of the Chicago, Burlington & Quincy Railroad. In turn, an assertion by Mr. Budd that the railroads are adequately equipped to meet defense requirements, made before a group of the association's executives at a meeting in Chicago on June 18, was understood to have been prompted by an unpublished survey made by R. N. Janeway for the National Resources Planning Board, which recommended the purchase of 500,000 freight cars to be built between now and June, 1942, or practically at the rate of 200,000 cars a year.

Mr. Janeway is said to have estimated that the equipment would call for 10,000,000 to 12,000,000 tons of steel, or between 4,000,000 and 4,800,000 tons a year. Unofficial estimates have been made that national defense steel requirements for the Army and Navy in the next two years will range from 10,000,000 to 12,000,000 tons a year. Other estimates run considerably above these figures.

Because of railroad opposition, it seems highly unlikely that the Janeway recommendations will be adopted. Suggestions that they be modified and the program pared down are believed to be a possibility, though even if they were it is said the carriers would not be agreeable.

BY J. R. WILLIAMS



Kettering Heads Board To Encourage Inventors

Washington

●●●Dr. Charles F. Kettering, president of General Motors Research Corp., has been named chairman of a National Inventors Council whose job will be to encourage inventions by civilians and to appraise their usefulness from the standpoint of national defense.

The judgment of the inventors council will be advisory to the National Defense Research Committee and to its parent organization, the National Defense Advisory Commission. The United States Patent Office, under jurisdiction of the Department of Commerce, is now required by law to examine patent applications in order that it may withhold from publication inventions whose disclosure "might be detrimental to the public safety or defense."

Under this law a determination of the military value of the disclosures is required. The task of the inventors council will be to perform a similar duty with respect to new ideas submitted in the form of a simple memorandum or rough blueprint instead of in the form required in patent applications.

USHA to Build 1550 Homes At Navy Yards and Bases

Washington

●●●The United States Housing Authority last week acted to provide housing needs occasioned by the expanding defense program by approving loans totaling \$5,670,000 to build 1550 homes for families at three naval reservations and for civilian workers employed by the Newport News (Va.) Shipbuilding Co.

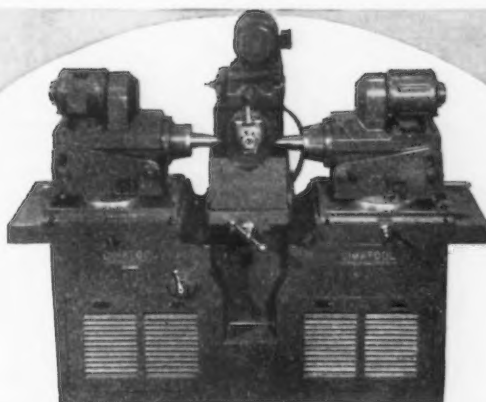
Loans to local housing authorities went to:

Corpus Christi, Tex.—\$989,000 for 250 homes for workers of the naval station under construction;

Portsmouth, Va.—\$2,160,000 for 600 homes for workers attached to the Portsmouth Navy Yard;

Pensacola, Fla.—\$715,000 for 200 homes for enlisted personnel and civilians at the naval air station.

Newport News, Va.—\$1,806,000 for 500 homes for workers employed at Newport News Shipbuilding Co.



CHAMFERING GEAR TEETH

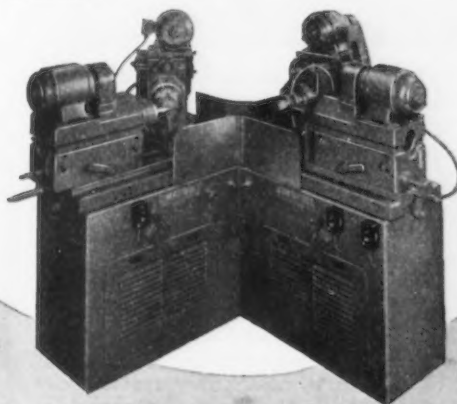
Is Now An Inexpensive Production Operation

CIMATOOL chamfering machines incorporate the principle that has finally combined flexibility with economy in gear tooth chamfering. Instead of presenting the tool to the work, Cimatool machines are built on the principle of presenting the work to the cutter, which rotates in a fixed position. This allows a heavier cutter spindle mounting and provides greater stability throughout.

Further, it permits the use of the hollowmill and pencil cutters as well as end mills and special cutters. Practically any type of chamfer is available from a regular wedge to any combination of circular arcs.

The work head incorporates all the mechanism necessary to the control of the machining operation. It is independently driven and its indexing movement is mechanically positive (always locked in mesh). Because of this construction it is not only quicker to set up but it provides higher production speeds.

The work gear spindle moves forward and backward in instant response to the rotation of a guide cam in the head assembly. The shape of this cam may be varied to provide any rate of cutting feed and in the case of pencil cutters an almost infinite variety of chamfers.



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Fatigue Cracks

BY A.H.DIX

They Didn't Know It Wasn't Loaded

... We suspect that the success of many businesses is due to the fact that the men at the top haven't the will power to refuse to try new ideas which people try to sell them. And, conversely, the initial fatigue crack that heralds the ultimate failure of a business is oftentimes an over-developed ability on the part of its brass hats to find the weak spots in a new idea and a myopic attitude toward the strong spots.

The thought we are clumsily trying to portray is illustrated aptly in this cartoon from *Sales Management*:



"Your sales resistance is fine, Mr. Emerson—but you must buy some materials once in a while to keep the plant going!"

Justice With Mercy

... I notice a comment in a recent issue of "Fatigue Cracks" on "excessive inspection."

The abuse of Magnaflux inspection is unfortunate, and we of the Magnaflux Corp. are continually doing all we can to prevent it. We are very much in favor of only rejecting parts in which the defects are known to be serious, either on the evidence of service failure or on that of mechanical tests.

We particularly feel that competent inspectors should be allowed the greatest latitude in interpreting their results and that in all cases of doubt, rejections should be reviewed by well seasoned metallurgical authority.

A. V. de Forest, President,
Magnaflux Corp., New York City.

Upsy Daisy

... As you know, in the radio field performers are judged by their "Crosley rating." This is determined by a continuous telephone poll.

In the trade paper field, the Crosley rating is the subscription renewal percentage. If an editor is clicking, the reader comes back for more; if he isn't, the reader cancels. Your family journal's next circulation statement will show that the renewal percentage has risen to 81.77, a Himalayan figure.

Application For A Shirt

... Regarding your item about the 15-34 shirt the Arrow people sent your editor, who wears a 16, I wear a 15-33. It would be a lot easier for me to have the sleeves cut down than for J. H. V. D. to have the neck cut up.

—E. G. Mahin, Department of Metallurgy,
University of Notre Dame.

He swapped it for a 16 neck. Sorry.

No Knowledge, No Sales

... There are those, you know, who damn advertising in toto as an economic waste. And then there are the other extremists who credit it with every advance since the Chinese invented movable type.

Although this is the last place to look for an unprejudiced opinion, considering that this journal is the world's largest carrier of advertising, we suggest trepidly that the truth lies somewhere in between. Advertising is, of course, simply a means of mass education, and as a spokesman we offer, of all people, the Soviet Commissioner of Foods, who says:

"It is essential to develop advertising so that the people may know about new products and goods, order them, and acquire a taste for them."

Hedy La Marrs By The Millions

... While there is justification for Government censorship of some of the more exuberant forms of advertising, we view with dismay the social consequences of the Federal Trade Commission's laundering of cosmetics and other advertising aimed at elevating the pulchritude of American womanhood.

Not only are color and romance being taken out of life, but serious harm to us as a nation may result. If, for example, a lady with a sex appeal rating in the lower brackets is convinced that six smearings of a certain cream will make her a menace to American youth, her self-esteem is nourished thereby and her attractiveness to the opposite sex is enhanced.

Multiply this by millions and you have a decidedly ponderable influence on vital statistics—an influence that is much needed now with the rate of population growth declining at an alarming rate. Our earnest hope is that before it is too late the Commission will give less thought to the letter and more to the psychological benefits of advertising.

Puzzles

... Each of last week's passengers was allowed 100 lb. without charge. The charge was at the rate of ½c. per lb. The passengers had 150 and 200 lb., respectively.

If you can solve this in 30 sec., without pencil and paper, your brain is highly heat resistant:

If there are 25 stations on a railroad, how many different tickets are required to connect every station with every other station?

These 5 men supervise the Heat Treatment of 1,000,000 POUNDS of steel a month

● If you do heat treating—you'll probably find plenty of helpful information in each issue of Heat Treating Hints, for back of every article appearing in Heat Treating Hints is the practical knowledge gained by these active and experienced heat treaters in supervising the treatment of a million pounds of steel a month.

Hundreds of executives, metallurgists, and heat treaters have written letters commenting on the straightforward and helpful manner in which everyday heat treating problems are discussed in Heat Treating Hints. In the current issue, for instance, the article on Straightening Carburized Steels is studded with practical pointers. Likewise the story of the new Cyanide and Rotary Carburizing Department at Lindberg Steel Treating Co. has plenty of new ideas of interest to heat treaters operating cyanide furnaces. Then there's a practical tip on taking the backstrain out of quenching heavy work—and Mac's column on the human side of heat treating—and the monthly cartoon—Strains and Stresses. All of it—every word—applies to practical, everyday heat treating problems.

We'll be glad to send Heat Treating Hints free regularly to any heat treater—metallurgist—or executive concerned with heat treating, upon request.

LINDBERG ENGINEERING CO.
222 No. Laflin Street, Chicago

Here are Comments from Readers

"I have looked upon this publication with a great deal of interest and look forward to issues that are to follow."

President of Spring Co.

"To me it is exceptionally interesting. I would like to continue receiving it and would appreciate your mailing copies to our superintendent."

President, Knife Company

"I greatly enjoy reading every issue of Heat Treating Hints."

Metallurgist—Wire Rope Co.

"Appreciate receiving our copies—they contain a great deal of helpful information."

Tool Room Supervisor, Refrigerator Co.

"Well pleased with excellent information. In my capacity as superintendent of tool division, the information given is of value to me—as well as to the foremen."

Supt. of Tool Division—Calculating Machine Co.

"Heat Treating Hints speaks a language that is so clearly understood by those who are close to the Heat Treating Operations."

Chief Metallurgist—Tool Co.

W. B. MacNERLAND

Dean of the editorial staff, "Mac" is widely known throughout the heat treating world as a practical and skilled man at making metals behave under fire.

W. P. BOYLE

Over \$17,000,000.00 worth of tools and dies have been hardened by Bill in 30 years of heat treating. His department in Heat Treating Hints is carbon and oil hardening steels.

R. B. SEGER

Plant Superintendent of Lindberg Steel Treating Co., Bob Seger supervises the heat treatment of hundreds of exacting jobs every week. Many years of work at the furnace are in back of him.

W. A. LILLIENBERG

Supervisor of Mechanical Equipment at L. S. T. Co., Sammy is an expert on straightening operations, and the design of special jigs, fixtures and quenching devices.

G. B. BERLIEN

"High Speed" Benny is well known to heat treaters throughout the middle west. There's hardly a high speed steel made with which he is not on intimate terms, and that's his department in Heat Treating Hints.

TYPICAL ARTICLES:

- Suggestions for Straightening Carburized Steels
- Time Quenching
- Hardening Stainless Steel
- Quenching Oil Cooling Systems
- Improved Design Quench Tank Saves Time and Energy
- Suggestions for Annealing Stainless Steel of Hardenable and 18-8 Types
- Straightening of Hardened Parts
- Effects of Eliminating Scale When Reheating Carburized Work

LINDBERG ENGINEERING CO.
228 North Laflin Street, Chicago

Please send *Heat Treating Hints* regularly, without obligation.

Name _____ Title _____
(PLEASE PRINT)

Company _____

Address _____

City _____ State _____

News of Industry...

Steel Employment and Payrolls Up in June

Employment in the steel industry rose during June to an average of 535,000 employees, according to a report by the American Iron and Steel Institute.

In May an average of 510,000 were on the industry's payrolls, while in June, 1939, employment averaged 451,000.

Steel payrolls also increased during June to a total of \$77,388,000 for the month, which compares with \$75,184,000 in May and with \$61,150,000 in June of last year.

Wage earning employees earned an average of 85.9c. per hr. in June, as against 85.1c. in May and 84.8c. in June a year ago.

The number of hours worked per week by steel wage earners averaged 35.9 in June, compared with 35.7 in May and 33.5 in June, 1939.

Electric Auto-Lite Co. Has 22% Gain in Volume

Toledo

••• The Electric Auto-Lite Co., large automotive parts maker with numerous plants, reported a gain of 22 per cent in its business volume for the first half of 1940 as compared with the same period last year. Net earnings for the six months ended June 30, after provision for taxes, interest on debentures, and minority interests in subsidiaries, was \$3,978,665. This compares with \$2,830,936 or \$2.36 a share in the corresponding period last year.

J. & L. to Modernize Blast Furnace Gas Washers

••• Jones & Laughlin Steel Corp. has awarded a contract to the Peabody Engineering Corp., New York, for the modernization of two blast furnace gas washers at the Eliza Furnaces, Pittsburgh Works. The new equipment is scheduled for installation late in September.

Lockheed and Vega Plants Expansion to Cost \$5,000,000

Burbank, Cal.

Details of the factory expansion program of Lockheed Aircraft Corp. and its subsidiary, the Vega Airplane Co., were outlined in a statement issued by Robert E. Gross, Lockheed president.

The Lockheed building program provides for the immediate erection of 18 new buildings having a total floor area of more than 520,000 sq. ft. The buildings alone will cost in excess of \$1,500,000, and equipment now on order will raise this figure another \$500,000.

The Vega company will erect a complete new factory on a 30-acre site adjoining Union Air Terminal. Fully equipped, the plant will cost in the neighborhood of \$3,500,000. Construction is already under way, and contractors expect the buildings to be ready for occupancy by late October.

When this expansion is completed, the two companies will have a combined floor area in excess of 2,100,000 sq. ft., which will more than double present plant facilities.

Manganese Imports For Birmingham Mills Gain

Birmingham

••• Heavy importation of manganese ore for Birmingham furnaces, with increase in other imported materials and manufactured products, brought receipts for the port of Mobile up to \$1,267,017 during the 1940 fiscal year, Joseph H. Lyons, Mobile collector of customs, said on a recent visit here. Mr. Lyons said virtually all the manganese, imported from countries including India, Brazil and Russia, was barged by inland waterway to Birmingham on the Warrior River, approximately 25 miles west of here. Collections on both import and export duties for the fiscal year were \$569,101 more than the \$697,916 total for 1939.

Canada Reports Severe Skilled Labor Shortage

••• The smallest Canadian labor reserve for the month of April in a decade, as the result of the war, was reported in the monthly letter of the Royal Bank of Canada for August. A substantial addition to the number of employed wage-earners has been made since April, 1939, it was stated.

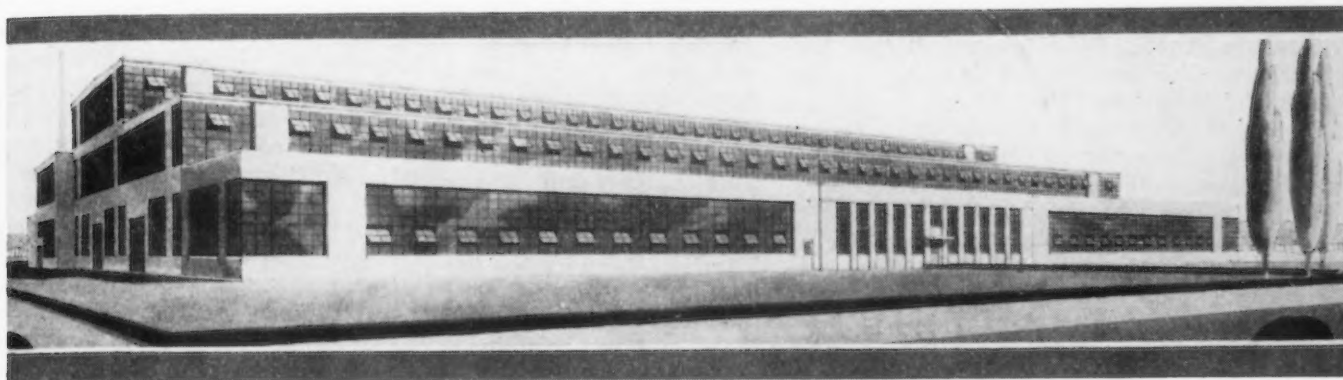
"No general scarcity of labor has resulted but many industries report a serious shortage of skilled artisans. If the same rate of increase is maintained during the next few months Canada will rapidly reach a condition of full employment. Factories and technical schools are training apprentices to overcome shortages in specialized workers. Longer working hours may continue for some time due to the rapid acceleration of production and the withdrawal of men from industry for military requirements," the letter reported.

Armco Debentures Sold To Insurance Companies

••• The American Rolling Mill Co. has contracted to sell to two insurance companies an aggregate of \$7,500,000 principal amount of 10-yr. 3 per cent debentures. The monies are to be used for the reduction of \$2,000,000 principal amount of 4 per cent first mortgage notes of the company, the payment of \$1,500,000 of bank loans and for additional working capital.

Shell Oil to Build Toluene Plant in Texas

••• Shell Oil Co. will begin immediate construction at Houston, Tex., of a plant to produce "toluene," basic ingredient of T.N.T. directly from petroleum, for the first time in the United States. The plant will cost \$500,000 and have a capacity of more than 2,000,000 gal. a year.



U. S. Arming May Require 2 Years To Get Going

••• The bottleneck in manufacturing for national defense is not in machine tool productive capacity but in inadequate fixture and gage production and in the small supply of supervisory technicians and skilled mechanics, William P. Kirk, vice-president, Pratt & Whitney, said this week at Litchfield, Conn.

The manufacturing phase of the national defense program will take from 18 months to two years to get into motion, he said. Because production of high grade military material and planes requires a higher technique than automobiles and many other mass production articles, the manufacturer changing his plant over to military equipment faces a monumental task, he said.

Mr. Kirk pointed to the misapprehension that the automobile industry could start turning out armored trucks, tanks, airplane engines and other war products as soon as a factory received a contract. He reported development of a new, simple type of lathe that can be operated by women and men unfit for military service in manufacture of shells. "Simple single-type lathes have been developed for various sizes of shells," he said, "and are ready to be produced by other than machine tool builders, but under experienced supervision. The idea is that in time of war all machine tool builders will be busy on their own

NEW MANUFACTURING plant being built at Mount Gilead, Ohio, by the Austin Co., Cleveland, for the Hydraulic Press Mfg. Co., for production of hydraulic presses. Castings and other raw materials will enter the plant at one end and proceed progressively through the various finishing and machining operations to the assembly floor. The present plant is also to be completely rearranged in keeping with the straight-line production methods to be used in the new plant.

standard lines while some well equipped shop, normally making other products, would be available for doing this necessary work for the government.

Coming Meetings

- Sept. 3 to 6—American Society of Mechanical Engineers, fall meeting, Spokane, Wash.
- Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.
- Oct. 2 to 5—Electrochemical Society, Inc., fall meeting, Ottawa, Canada.
- Oct. 14 to 16—American Gear Manufacturers Association, semi-annual meeting, Skytop, Pa.
- Oct. 16—Porcelain Enamel Institute, fifth annual forum, Urbana, Ill.
- Oct. 21 and 22—Associated Machine Tool Dealers of America, annual convention, Dayton, Ohio.
- Oct. 21 to 25—National Metal Congress, Cleveland.
- Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

2 CIO Unions Named Bargaining Agents

Washington

••• The National Labor Relations Board last week:

1. Recognized the CIO's Amalgamated Association of Iron, Steel & Tin Workers as the collective bargaining agency for production and maintenance employees of American Fork & Hoe Co. (Skelton Shovel Worker), Dunkirk, N. Y.; the CIO's United Electrical, Radio & Machine Workers of America, for production and maintenance employees of Westinghouse Electric & Mfg. Co., Bloomfield, N. J.; the AFL's Bay Cities Metal Trade Council for a majority of employees of Pacific Gas Heating Co., San Francisco.

2. Called several elections to permit tool room, machine shop, fitting and experimental department employees of Lincoln Engineering Co., St. Louis, to vote for the AFL's machinists union, the CIO's automobile workers union, the Lincoln Employees Benefit Association, or for none; to permit the remaining production and maintenance employees to vote for the CIO union, for the benefit association, or for neither; to permit platers, polishers and helpers employed by Kingston Products Corp., Kokomo, Ind., where the SWOC has a contract covering all employees, to vote for or against the AFL's polishers, buffers, platers and helpers union.

3. Ordered the Aluminum Goods Mfg. Co., Manitowoc and Two Riv-

ers, Wis., to refuse to recognize the A.G.M. Workers Association; and to cease discouraging membership in the AFL's aluminum workers union, and the AFL's machinists' union; and to offer reinstatement with back pay to 10 workers and to pay 12 others for any losses suffered in December, 1937; ordered the Triplex Screw Co., Cleveland, to withdraw recognition from Independent Employees Association of Triplex Co.; to cease discouraging membership in the CIO's Amalgamated Associa-

tion of Iron, Steel, and Tin Workers union, and to reinstate with back pay eight former employees.

4. Approved a consent decree to be presented to the Circuit Court of Appeals under which the Pacific Gas Radiator Co. of Los Angeles will cease the alleged practice of discouraging membership in the CIO's Amalgamated Association of Iron, Steel, and Tin Workers Union. The NLRB, under the decree, dismissed the allegation that the company had refused to bargain collectively with the union.

Further Clarification of Scrap Export Restrictions Is Likely

Washington

• • • Government officials concerned with administering the new export license restriction on No. 1 heavy melting steel conceded this week that scrap licensing regulations issued to date may require further clarification to remove any shadow of doubt concerning their application to heavy steel rails, car wheels and other railroad specialties. Some officials admitted that it may be possible to receive clearance without a license for the exportation of such grades of railroad scrap and that failure to define further the term "No. 1 heavy melting scrap" may disclose loopholes serious enough to partially circumvent the export restriction.

While it was indicated in some quarters that the problem was being discussed by officials in the National Defense Advisory Commission, there was no immediate substantiation of these reports at the offices of the commission. It was said that while the Presidential proclamation of July 26 brought only No. 1 heavy melting scrap under the licensing regulation, which became effective Aug. 1, it was their understanding that customs authorities could be expected to consult the classification of iron and steel scrap published in the Commerce Department's simplified practice recommendation, if controversy arose.

The specifications of the Department of Commerce, which govern

the preparation, sale, and purchase of most scrap, define No. 1 heavy melting steel as "steel scrap $\frac{1}{4}$ in. and over in thickness, not over 18 in. in width, and not over 5 ft. long. Individual pieces must be cut into such shape that they will be free from attachments and will lie flat in a charging box. Cut boiler plate must be practically clean and free from stay bolts and not over 3 ft. long and lie reasonably flat in charging box. Smaller dimensions of plate scrap may be required upon mutual agreement between buyer and seller. No piece to weigh less than 5 lb."

The definition further provides that "this grade may also include new mashed pipe ends, original diameter 4 in. and over, thoroughly flattened, sheet bars, billets, blooms, rail ends, railroad steel, and wrought scrap. . . ."

It was reported at the State Department's division of control, the agency to which application is made for a scrap export license, that the status of railroad scrap had not been questioned so far as was known and there had been no necessity for instructing customs officials on a further definition of No. 1 heavy melting scrap. It was indicated, however, that if the administrator of export control finds it necessary to clarify the question, customs officers will be promptly notified by the State Department to clear up any misunderstanding.

Nevertheless, it was indicated in other official quarters that the question definitely was being surveyed in order to ascertain the status of heavy steel rails and other railroad scrap which, it was admitted, might be as desirable, if not more so for some buyers, than the No. 1 grade. It was conceded that failure to clarify the order might result in at least partial circumvention of the export restriction, and some reports implied that difficulty of enforcing the export ban might prompt a tightening of the restriction.

At the time it was understood that one of the factors under scrutiny was the quantities of railroad scrap available for export. It was explained, too, that officials may be slow to seek a clarification of the order, if such is found necessary, on the theory that it would be better to invoke broader scrap licensing restrictions gradually.

Republic to Enlarge Gulf States Furnaces

Birmingham

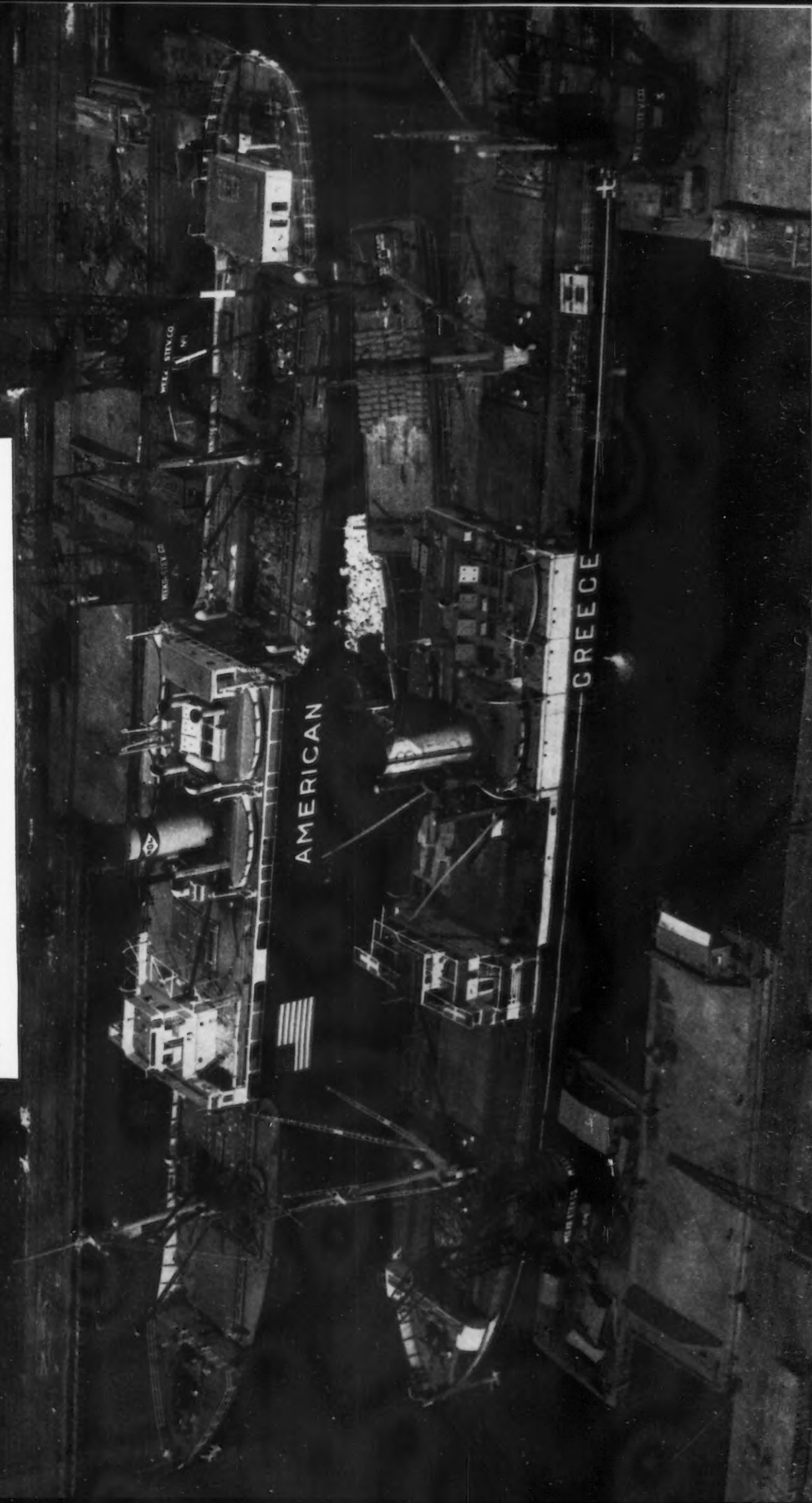
• • • Two open hearth furnaces of 90-ton capacity will be enlarged to 125 tons each at the Gulf States plant of the Republic Steel Corp., it has been announced by C. E. Evans, Republic district manager at Gadsden. One of these has been taken off this week for enlargement, which accounts for a lower rate of production in the Birmingham district. The other will be enlarged before the end of the year.

Mr. Evans also said that July will break all shipping and production records at the Gadsden plant.

Carnegie-Illinois Makes New Production Records

Chicago—The blast furnace and open hearth departments of Carnegie-Illinois Steel Corp.'s South Chicago works hung up new production records in July with nine blast furnaces producing 276,761 net tons of pig iron and the open hearth steel making division producing 280,966 net tons of open hearth ingots. Previous records were made in June when 261,757 net tons of pig iron and 276,491 net tons of open hearth steel were produced.

THESE TWO BOATS SHOWN BEING LOADED WITH SCRAP AT THE JERSEY Central Railroad piers at Jersey City on July 30 either completed their cargoes or stopped loading No. 1 heavy melting steel at midnight, July 31, pending government action on applications for licenses to export this grade, which has been running from 20 to 40 per cent of recent scrap cargoes. The American ship is the S.S. Bienville, loading for Japan, and the Greek boat is the S.S. Anna Bulgaris, loading for Great Britain. Both ships are breasted away from the piers by deck barges and floating cranes carrying magnets.



MORE WAITING TIME CAN BE WORKING TIME



Much of the waiting time of men and machines becomes producing time when "Budgit" Electric Hoists are installed to do the lifting wherever it is now done manually, or with chain blocks... They increase production, speed the work, and take all physical effort out of lifting, and earn their low cost over and over again out of savings.

"Budgit" Hoists come in 250, 500, 1000, and 2000 pounds lifting capacity with speeds to suit today's tempo... You can afford them! Prices start at \$119, and there is nothing else to buy before you can use them. You simply Hang Up, Plug into the nearest electric socket, and Use!

Send for catalog containing complete information, also "Time Savings Calculator" that shows savings they earn.

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"BUDGIT" HOISTS**

Many French Steel Plants Idle Owing to Coal and Coke Shortage

The German correspondent of THE IRON AGE sends the following communication from Spain, where he arrived after a motor trip through the occupied and unoccupied areas of France.

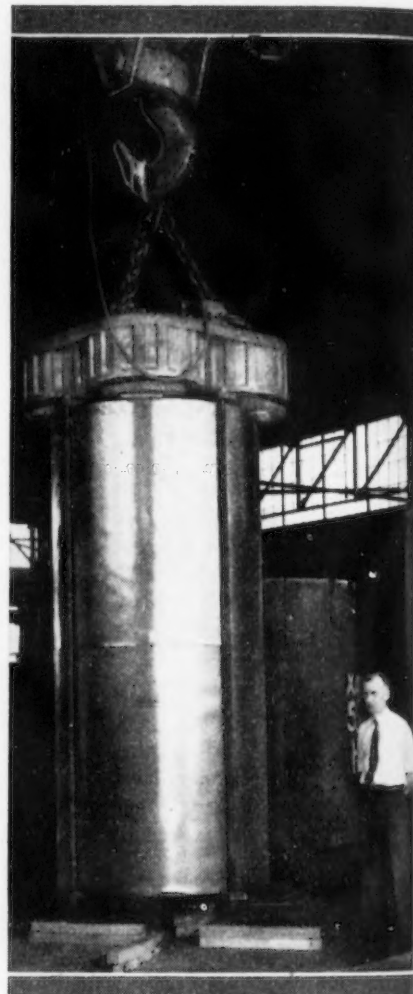
German steel works are now getting large deliveries of Lorraine iron ores. Everywhere in the Ruhr can be seen the Lorraine iron ore cars with full loads, but the Lorraine iron and steel works are to a considerable part idle.

Nearly completely idle are the Acieries de Knutange, whereas the Petit Fils de Wendle works are partially in operation. Also the steel works in the French departments Moselle and Nord are mostly idle, particularly those which were near the Maginot line, as those of Longwy, Longuyon, Pont à Mousson. An investigation is taking place at the moment concerning possibilities of returning to full work. The difficulty is the scarce supply of coal and coke. More than 50 per cent of the North French coal mines are abandoned, the workmen having fled, and most of them are full of water, particularly the mines in the Artois and Pas-de-Calais. It will be months before these works can resume operations.

In the other parts of France conditions are better, but the division of France into two halves, the occupied and non-occupied territory, is disastrous for the economic life. The aluminum and bauxite companies of the South have full stocks and nobody can take delivery, the steel works there get no supplies of pig iron and semi-finished steel, many works are occupied by thousands of fugitives and business is in pieces.

The economic reconstruction of France will be a very serious and hard problem, particularly as the population is seized by a feeling of resignation and tends to live on charity. The difference with Germany of 1918 is striking. The Germans of 1918, half starved and still blockaded up to June, 1919, set at once to work, everybody in spite of the political unrest, revolts, putsches, etc., did some-

thing, organized something, got busy and helped out, muddling through somehow and started soon to reconstruct. The French, although the real war was short, are utterly exhausted, tired, and have apparently lost entirely the will to take their fate in their own hands.



A COIL HANDLING magnet which on test has lifted a total load of 56,600 lb. has been installed at the Middletown, Ohio, plant of the American Rolling Mill Co. The magnet, which is the product of the Electric Controller & Mfg. Co., Cleveland, was rated to lift 40,000 lb. with a safety factor of 50 per cent. To meet the trend toward bigger and heavier coils of strip steel, the E. C. & M. company is now building for another mill five larger magnets of similar design, each with a rated capacity of 60,000 lb. with a 50 per cent safety factor.

The millions of fugitives do nothing by themselves, but wait until the German authorities step in and organize their return, help them and look out for them.

The Germans have seized enormous stocks in France. Stores of raw copper seized are 42,000 tons, zinc 37,000 tons, lead 19,000 tons, tin 3600 tons, nickel 1700 tons, quicksilver 700 tons, a government stock of some 230,000 tons of guns and anti-tank guns (mostly not yet milled). Besides very great quantities of cotton, wool, timber, etc. Stocks of barbed wire seized were about 9000 tons, other wire 8000 tons, and nails about 4500 tons, more than 53,000 motor cars and some 29,000 trucks, not counting the enormous booty in fully or half destroyed trucks and cars lying in the thousands all over France. The steel contained in the booty, which is now everywhere collected, is sufficient to cover Germany's import demand of steel scrap for nearly three and a half years. Shipments of scrap have already been started to Italy. The quantity of ammunition, brass, etc., is not yet counted. Germany is starting to export part of this material, not only to the Balkans, but also to the Western countries and very soon also overseas.

The Spanish iron and steel industry is prospering. The Bilbao iron and steel works are working at full capacity, also the numerous small electro steel works, hardware works, etc., in the north of Spain are fully engaged with work. The pre-civil war production has been already largely exceeded, because coal supplies are ample. The only weak point is the iron ore export business, as Germany and Italy take now virtually nothing and Great Britain takes only a comparatively small part of the output.

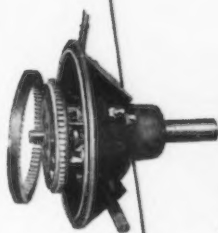
H. A. Brassert & Co. Awarded Donora Blast Furnace Job

Pittsburgh

••• The relining job on American Steel & Wire Co.'s Donora, Pa., No. 1 blast furnace and the construction of a new primary washer as well as the relining of three stoves, mentioned in THE IRON AGE, May 23, was awarded to H. A. Brassert & Co., Chicago. Work is expected to be completed in five months.



He doesn't have to call the factory!



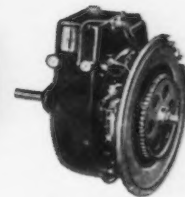
Power Take-off



Heavy-Duty Clutch



Marine Gear



Torque Converter

● When you ask a Twin Disc representative to call in regard to some clutch or power transmission problem, you'll find him a competent engineer, trained to advise and serve you expertly . . . experienced in handling the widest variety of clutch applications.

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G. Cook Kimball Goes to Capital For U. S. Steel

Chicago

B. F. Fairless, president, United States Steel Corp. has announced that, in the interest of further coordinating United States Steel activities arising from the increasing requirements of the national defense program, G. Cook Kimball, executive vice-president, United States Steel Corp. of Delaware, with headquarters in Chicago, will, effective Aug. 15, temporarily make his headquarters in Washington.

This change, it is stated, is for the purpose of providing the fullest cooperation by United States Steel subsidiaries in serving the needs of the national defense program.

During Mr. Kimball's temporary absence from Chicago, Charles H. Rhodes, vice-president of United States Steel Corp. of Delaware, will take over the activities and duties that now come under Mr. Kimball's direction.

Mr. Rhodes has been connected with United States Steel companies for over 40 years, of which 15 years were spent in Chicago, where he will resume his residence. He has been a vice-president and director of United States Steel Corp. of Delaware and a member of its executive committee since the formation of that corporation.



G. C. KIMBALL



C. H. RHODES

No Labor Shortage Seen by Bethlehem At Present

Bethlehem, Pa.

••• Bethlehem Steel Co.'s current production schedules are not being hampered by a shortage of skilled, semi-skilled or common labor, the company reports in the August issue of *Bethlehem Preview*, a publication for employees.

While the shipbuilding and ordnance programs will require many additional workers, no insurmountable difficulty in meeting future labor requirements through an expanded training program is expected by Bethlehem officials. This program, put into motion largely for the shipbuilding division, may ultimately train more than 10,000 persons to meet the nation's defense needs as far as this task will be shared by the Bethlehem company.

Bethlehem's work-sharing policy, particularly in 1937 when its plants operated at capacity with a full quota of employees, has been an important factor in the present favorable labor supply. Bethlehem's employees were told.

Instructors in the new training course are being selected from the best skilled mechanics of the various trades among employees on a basis of craft knowledge, learning capacity, ability to get along with fellow employees and aptitude for teaching.

Television Men Organize To Further Development

It will be the responsibility of the National Television Systems Committee to publicly announce the full commercial realization of television, James L. Fly, chairman of the Federal Communications Commission, told the organization meeting of the new National Television Systems Committee, held in New York, July 31. The committee will be an independent organization, sponsored by the Radio Manufacturers Association with the recognition of the FCC.

Dr. W. R. G. Baker, director of the association's engineering division and manager of the General

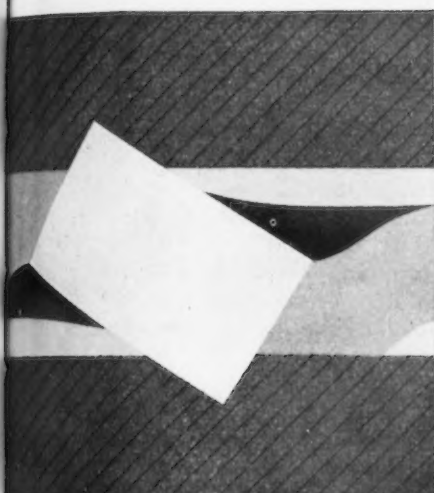
Electric radio and television department, Bridgeport, Conn., who has been appointed chairman of the committee, declared that it must determine the basic standards for a system of communication capable of transmitting intelligence in a form which will "probably have more effect on the life of the American people than any system known today."

Members and official representatives of the committee are: Adrian Murphy, executive director of television for Columbia Broadcasting Systems; Harry R. Lubcke, director of television for Don Lee Broadcasting System, Los Angeles; Allen B. DuMont, president of the DuMont Laboratories Inc.,

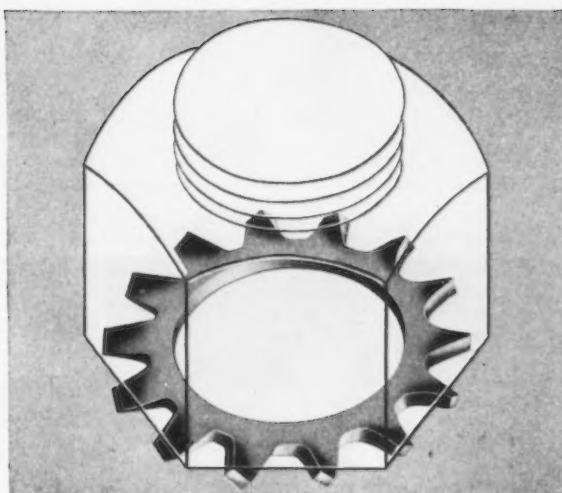
Passaic, N. J.; B. Ray Cummings, vice-president of Farnsworth Radio & Television Corp., Fort Wayne, Ind.; Dr. E. F. W. Alexanderson, consulting engineer, General Electric Co., Schenectady, N. Y.; Daniel E. Harnett, chief engineer, Hazeltine Corp., Jersey City, N. J.; John V. L. Hogan, New York; Albert I. Lodwick, Hughes Tool Co., Houston, Tex.; Dr. A. N. Goldsmith, Institute of Radio Engineers, Inc., New York; David B. Smith, Philco Corp., Philadelphia; E. W. Engstrom, Radio Corp. of America; Frederic C. Young, chief engineer, Stromberg-Carlson Telephone Mfg. Co., New York; John R. Howland, secretary, Zenith Radio Corp., Chicago.

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War Department Negotiates for Three Anti-Aircraft Gun Plants

Washington

••• House approval of a new \$4,963,151,957 Army and Navy appropriation bill, an estimate that 360,000 tons of heavy forgings will be needed in the next three years, and disclosure that the War Department is negotiating with three automotive concerns for the construction of plants to manufacture a heavy 37 mm. aircraft gun featured defense developments last week as the Administration launched a publicity barrage to counteract reports that its preparedness program was "bogging down."

In a fast-moving week that found businessmen moving in and out of Washington at a rate unequalled since NRA days, these were the developments:

1. Both War and Navy Departments made ready to release con-

tracts already negotiated just as soon as President Roosevelt signs the \$4,963,151,957 Army and Navy appropriation bill. Providing funds for starting work on the 70 per cent increase in naval strength, the measure calls for \$1,051,156,540 for the Navy and \$3,911,995,417 for the Army, these figures including contract authorizations for \$2,728,960,000 and direct appropriations of \$2,234,191,957. Principal items in the bill include \$230,000,000 for new ship construction; \$75,000,000 for alteration and conversion of naval vessels; \$2,068,402,304 for both Army and Navy aircraft; and \$2,057,705,017 for a wide range of material for the Army, Navy and Marine Corps.

2. Representatives of 18 companies met with Government defense experts at the invitation of Rear Admiral William R. Furlong,

chief of naval ordnance. It was announced following the conference that approximately 360,000 tons of heavy forgings will be needed in the defense program during the next three years.

3. The War Department is negotiating with Chrysler Corp., General Motors Corp., and Bendix Corp., for the construction and operation of gun plants whose job will be to turn out 37 mm. guns for use on aircraft. These, according to present plans, will be used to supplement the 30 and 50 caliber machine guns now carried on Army combat planes. Bendix, already engaged in preliminary plans for manufacturing the heavier type of aircraft gun, may expand existing facilities while the other two concerns may build two plants in the Middle West to cost a total of \$14,000,000.

4. The White House, showing signs of being displeased over persistent reports that the defense program was slowing down because of uncertainty concerning amortization and the Administration's anti-trust policy, delegated Publicity Director Robert M. Horton of the National Defense Advisory Commission to meet with the press and clarify the status of the defense program. Mr. Horton reflected a Presidential denial issued earlier in the day that the program was bogging down because of uncertainty over future taxes on profits, insisting that manufacturers "generally" are going ahead with production plans. He cited the production schedule being followed by American Car & Foundry Co., which he said is turning out three tanks a day under contract calling for a total of 1156 units, production to be doubled shortly.

5. Aircraft manufacturers, after conferring with National Defense Commissioner William S. Knudsen, head of the agency's production division, said they were prepared to go ahead with Army and Navy orders and would sign contracts without waiting for Congress to take final action on amortization proposals which provide for a quick write-off of depreciation for tax purposes. Donald W. Douglas, president of the Douglas Aircraft Co., announced that the industry was going ahead in order "to avoid long and costly delays and loss of many months of production while technical and legal difficulties are being ironed out by legislative en-

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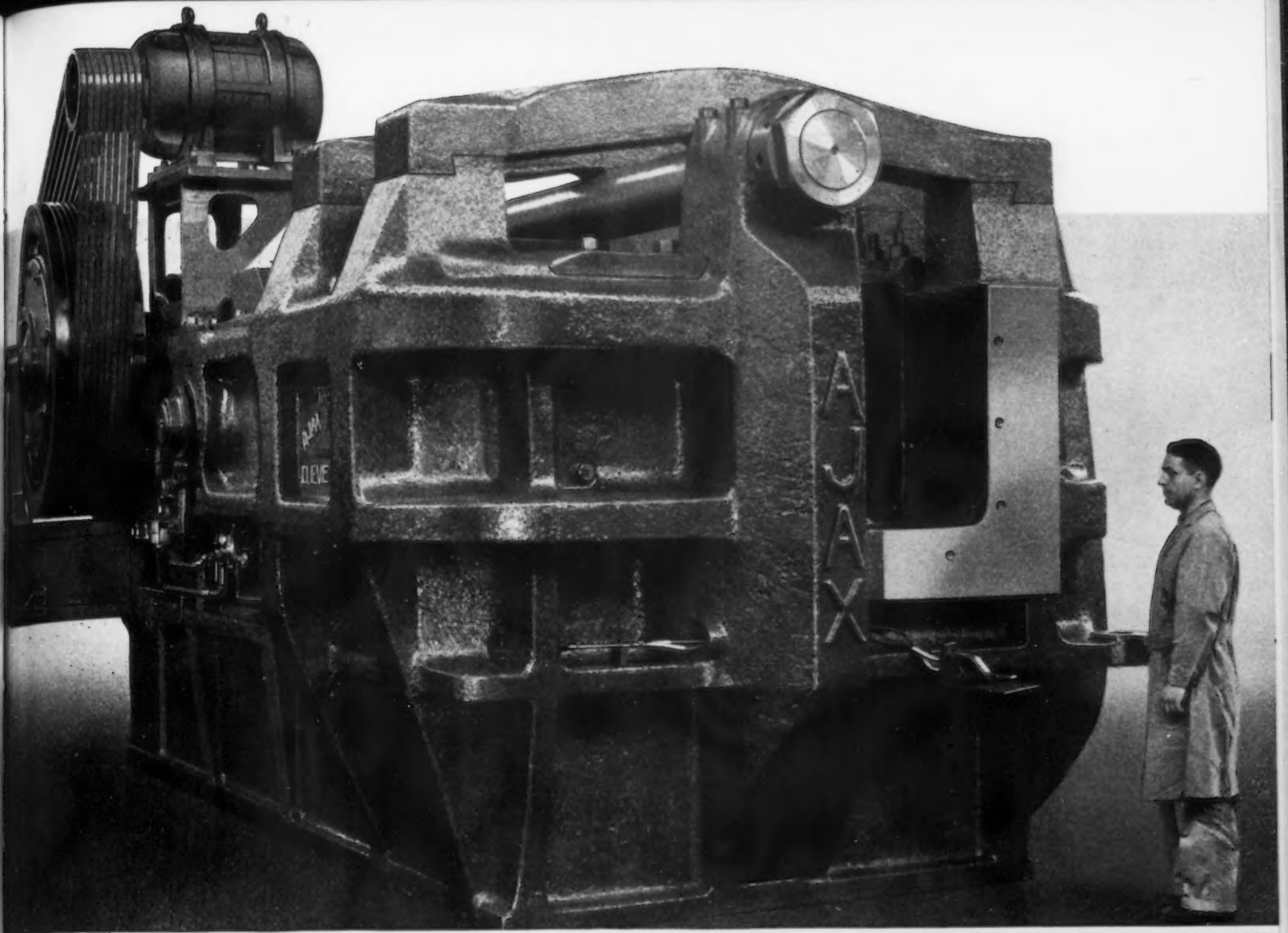
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FLINT, MICH., has just staged a Motor Festival, the theme of which was "Industry Stands Ready for National Defense." The CIO and AFL unions cooperated with business leaders of Flint in putting on this municipal celebration of Flint's importance as an automobile manufacturing center. A scroll was presented to President Roosevelt in which signers pledged themselves "as workers in American industry to defend and preserve the peace of our country."

actments." Prior to being called to Washington by Mr. Knudsen, aircraft manufacturers were reported to have asked that final action on contracts be deferred pending more definite assurances on the outcome of the amortization question.

6. The House approved an amendment to the Army and Navy appropriation bill, taking away from the Secretary of the Navy power to take over and operate private industrial plants for national defense purposes. Such power had been authorized several weeks ago in the bill to expedite naval shipbuilding. The National Defense Act of 1916 already empowers the President to take over private plants, but only "in time of war or when war is imminent."

7. The Justice Department announced that out of a total of 800 plants and manufacturing establishments which the military authorities included on a priority list in September, 1939, the Federal Bureau of Investigation has surveyed and made recommendations

for 270. This program for scrutinizing the facilities of industrial establishments, designed to afford a maximum of protection, is expected eventually to cover some 12,000 plants.

8. The House Ways and Means Committee gave tentative approval to a provision in the excess profits tax bill under which defense contractors could deduct the cost of necessary plant expansion from taxable earnings. Corporations would be permitted to amortize plant expansion costs over a five-year period, at an annual amortization rate of 20 per cent. Business representatives were quick to cheer a statement by Chairman Pat Harrison of the Senate Finance Committee that he hopes to get final action on the new tax bill within a month.

9. Secretary of the Navy Frank Knox urged naval contractors to take all precautionary measures to forestall delays and halt any unnecessary migration of labor. Citing the possibility of labor short-

ages as a factor likely to retard the shipbuilding program, Mr. Knox warned that "pirating" of labor always leads eventually to uneconomical and disastrous results. The Secretary of the Navy also urged private industry to start apprentice courses for employees and to increase apprentice-training facilities where such already exist.

10. The Metals Reserve Co., an agency established several weeks ago under the Reconstruction Finance Corp., has contracted for a total of 127,000 tons of manganese from South Africa and India. The agency was reported also to be negotiating for 10,000 tons from Chile.

11. The Administration moved to increase competition in the aluminum industry — a step described as "swell" by Assistant Attorney General Thurman Arnold, head of the Justice Department's anti-trust division—by approving an RFC loan to the Reynolds Metals Co., of Richmond, Va. A loan of \$15,800,000 will permit the company, according to Federal Loan Administrator Jesse H. Jones, to produce as well as process aluminum and to construct a plant in the Tennessee Valley where facilities of the Aluminum Corporation of America are located.

Gray Iron Founders' Society Annual Meeting on Sept. 12

• • • The Gray Iron Founders' Society, Inc., will hold its annual meeting at the Hotel Cleveland, Cleveland, at 10 a. m. on Thursday, Sept. 12. Plans will be discussed to meet the problems of rearmament and cooperation in connection therewith with the federal government.

Toledo Company to Make Electric Ranges, Heaters

Toledo

• • • The Swartzbaugh Mfg. Co. will go into production on a new line of electric ranges and water heaters next month. For more than 50 years the company has been making food-heating equipment.

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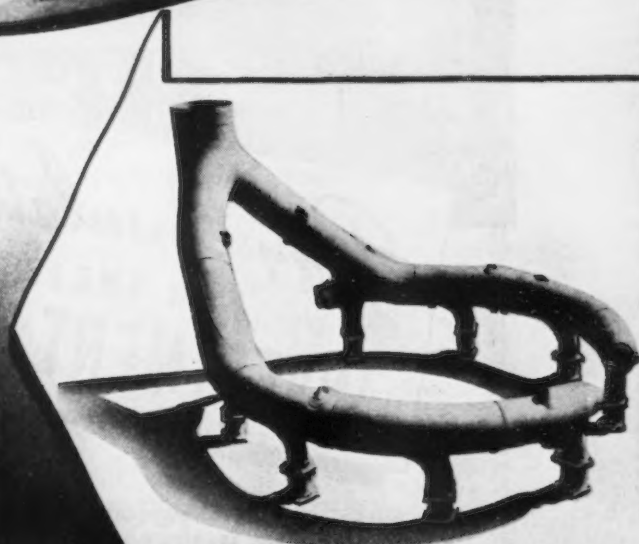
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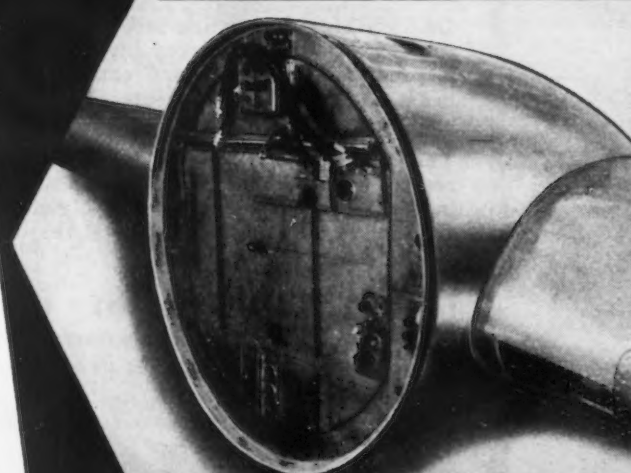
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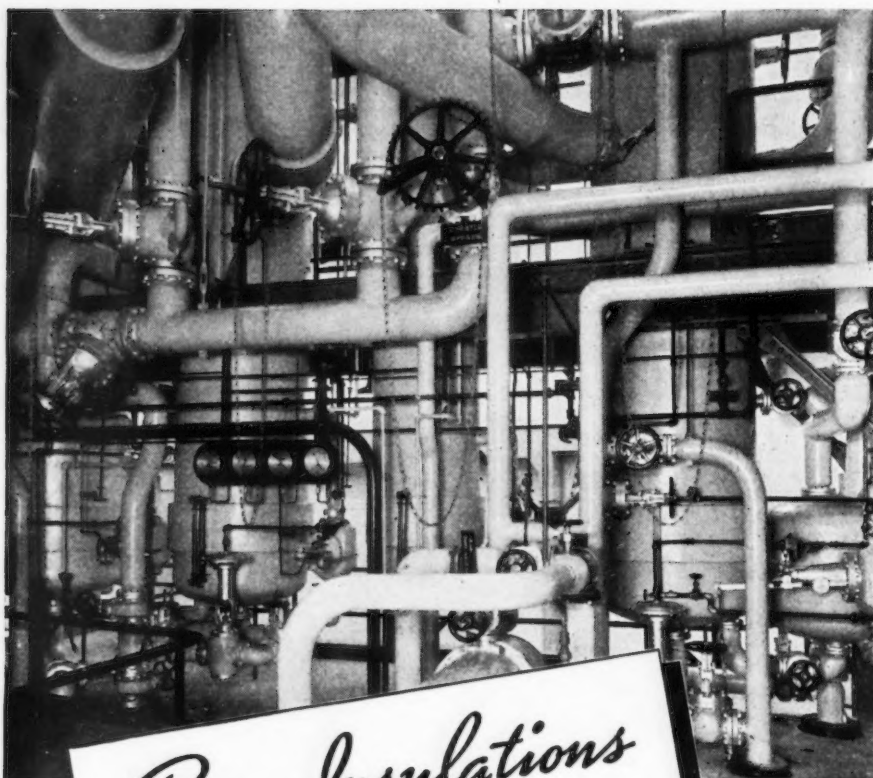
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CAREY Heat Insulation meets all service conditions from sub-zero to 2500° F. High efficiency insulation is important; but just as vital is practical knowledge and experience. The CAREY Organization has a background of 67 years of actual contact with every conceivable insulation problem.

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Davidson Ore Mine Goes to Pittsburgh Coke & Iron Co.

Pittsburgh

• • • Pittsburgh Coke & Iron Co. has acquired a substantial controlling interest in the Davidson Ore Mining Co., Buffalo, which has three underground ore mines located in the Menominee Range of the Upper Michigan Peninsula, with a capacity of 300,000 tons a year.

As a result of this acquisition, Pittsburgh Coke & Iron has also obtained a minority interest in the Struthers Iron & Steel Co. at Struthers, Ohio, since the Davidson company, before acquired by Pittsburgh Coke & Iron, owned a minority interest in the Struthers company. It has been emphasized that Pittsburgh Coke & Iron has not taken over any of the assets or assumed any of the liabilities of the Struthers company.

An official of the Pittsburgh Coke & Iron will become vice-president of the Davidson Ore Mining Co., which produces ore known in iron circles as foundry grade, of which Pittsburgh Coke & Iron uses a substantial amount.

The Pittsburgh Coke & Iron Co. maintains a merchant stack at Neville Island, Pa., near here, and also a blast furnace at Sharpsville, Pa. The Struthers furnace is located at Struthers, Ohio, and has an annual capacity of about 150,000 tons.

AFL Machinists Seeking Standard Wage Rates

Milwaukee

• • • AFL machinists' officials are making plans for standardizing wage rates and working conditions in the area in preparation for the national defense program. It is hoped to induce employers to adopt a schedule of minimum rates calling for a bottom of \$1.05 per hr. for tool and die makers and boring machine operators and \$1 per hr. for other machinists, pattern makers, heat treaters and welders. A more adequate apprenticeship system among the smaller firms also is sought. An effort will be made to secure one apprentice to each five skilled workmen.

Intense Demand for Pig Iron in England

London

• • • With the British iron ore position rather uncertain at the moment as regards imports, it is encouraging to observe that domestic production is being steadily increased and that the collection of scrap has proceeded even more vigorously following the Ministry of Supply's Order authorizing its compulsory collection.

The recent advance in pig iron prices has been followed by an even more intensive demand, especially for basic. Producers of low-phosphorus and hematite are very heavily engaged and there is an urgent inquiry for irons of special quality.

In the steel trade there is little change in the position as regards semis, but some rerollers have very limited reserves. However, this stringency will be eased when heavy imports from abroad, which have recently arrived, have been distributed.

Producers of finished steel have a vast amount of work in hand and are faced with a continuous flow of fresh government contracts, while the shipyards call for ever-increasing deliveries. All plants appear to be operating at capacity and large tonnages of special steels are being delivered. Makers of steel rails are also engaged to capacity and large supplies of rails have been ordered from the United States to supplement domestic output.

Herbert Morrison, British Minister of Supply, is planning to speed-up the national scrap collection campaign. Mr. Morrison sees no reason why such scrap as car tracks and railings, which require no treatment, should not be sent direct from the site of collection to the blast furnaces, instead of being first sent to merchants' yards.

Mr. Morrison is anxious to carry out an immediate nation-wide survey of all existing scrap, and he proposes to use the wide powers conferred upon him to take scrap when and how he wants it and deliver it wherever it is most urgently needed, regardless of ownership, commissions, or trade practices.

A Modern Development of an Ancient Product

The O. Hommel Company, world's most complete ceramic supplier, announce the perfection of a new process in porcelain enamel manufacture. This new method, called the Hommelaya Process of Vitreous Enameling, is the Hommel company's answer to cheaper synthetic finishes that have neither the durability nor beauty of a porcelain enamel finish. Requiring only one firing operation as against three or more in ordinary porcelain enamel manufacture, the Hommelaya Process offers a similar finish with even greater adhesion qualities than ordinary porcelain enamel. Because of the elimination of certain unnecessary plant operations it is possible to increase production and thereby lower manufacturing costs. The Hommelaya Process is adaptable to practically any commercial shape or design and may be produced in any shade of color desired. Perfected in the vast laboratories of the Hommel company and those of the internationally famous Mellon Institute, this process is the only revolutionary development in porcelain enamel manufacture since its inception in this country.

For further information write the O. Hommel Company, 209 Fourth Ave., Pittsburgh, Penna. Your inquiry will receive prompt attention.

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209 Fourth Avenue Pittsburgh, Pennsylvania

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Barter Trading By U. S. Will Be Necessary, Says Banker

San Francisco

••• A belief that the United States will have to trade on a barter basis if it wishes to sell its surplus crops and goods of its mass production industries when normal conditions again prevail was expressed by Joseph C. Rovensky, vice-president of the Chase National Bank, in an address before the National Foreign Trade Convention.

"We must be willing to open the channels of import trade to the United States if we wish to sell surplus crops and mass production goods," he said. "We must recognize that there are only three ways in which foreign countries can pay us for the American exports we sell to them and also service their financial obligations to us. These three ways are in goods, in services such as travel, and in gold. The tremendous inflow of gold in recent years has created a prob-

lem of immense difficulty in itself and certainly we cannot expect that of gold will continue indefinitely on a one way street.

In discussing means of achieving American hemispheric solidarity he said, "There is a job to be done on tin, first to increase the production of tin ores in South America and second to create refining facilities in this country to make the Western Hemisphere self-sufficient in this essential metal."

H. A. Brassert & Co. Move General Offices to New York

••• H. A. Brassert & Co., steel plant and blast furnace engineers, have moved their general offices from Chicago to 60 East 42nd Street, New York, where for some time a branch office has been maintained. Mr. Brassert now makes his headquarters in New York. A. B. Markus, secretary and treasurer, has also moved from Chicago to New York.

Canadian Production of Iron and Steel High

Ottawa

••• Canadian production of iron and steel in June showed a minor decline from the all time record level of May. Pig iron output totaled 88,656 gross tons, down from 93,254 tons in May, and compares with 52,805 tons in June, 1939.

Production of ferroalloys in June was 10,128 tons compared with 10,272 tons in May and 10,015 tons in June a year ago.

Output of steel ingots and direct steel castings in June totaled 166,213 tons against 174,417 tons, all time record in May, and 107,902 tons in June, 1939.

The following table shows iron and steel production in Canada for the six months ended June 30, compared with the corresponding half year of 1939:

	Gross Tons	
	1940	1939
Pig iron	549,627	296,521
Ferroalloys	58,244	30,904
Steel ingots	920,562	556,915
Steel castings	37,684	23,226

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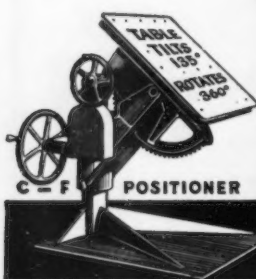
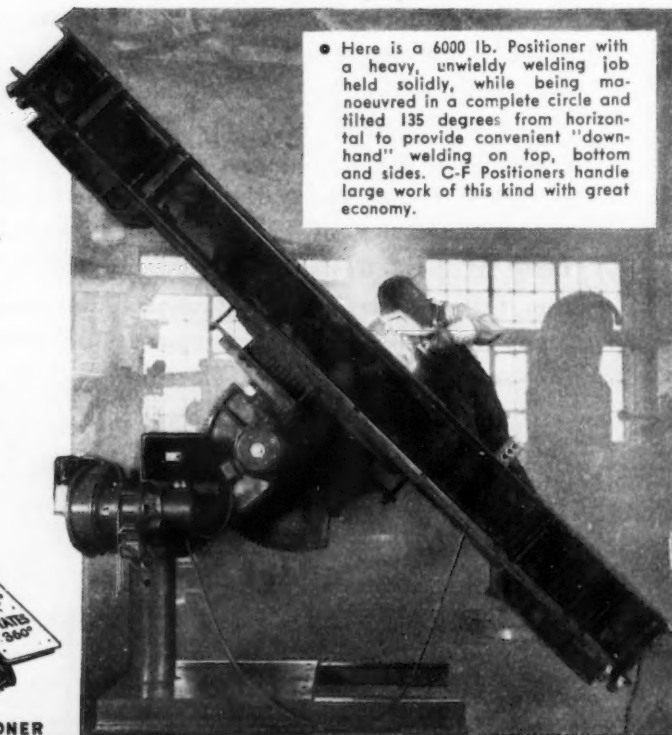
Position the work this way and save crane service, welder's time and handling costs.

C-F Positioners are available in four sizes, 1200, 2500, 6000, and 14000 lb. capacities.

Tilting and rotating movements of table are independently controlled on both power and hand-operated machines.

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Cleveland Materials Testing Committee Elects Tuscany

••• The Cleveland District Committee of the American Society for Testing Materials has chosen officers as follows: chairman, Arthur J. Tuscany, Tuscany-Turner & Associates; vice-chairman, Arthur W. Carpenter, B. F. Goodrich Co., and secretary, W. W. Rose, Gray Iron Founders' Society. Dr. L. M. Currie of the National Carbon Co. has been appointed to the Cleveland District Committee to succeed F. L. Plummer, who is leaving Cleveland.

Young Radiator Co. Strike "Satisfactorily" Settled

Racine, Wis.

••• The Young Radiator Co. strike, begun on June 3, has been ended with a settlement "satisfactory to both the union and the company," according to CIO officials, although company officials offer no comment. About 250 production and 110 office employees are involved.

British Concentrating On Armament Production

Detroit

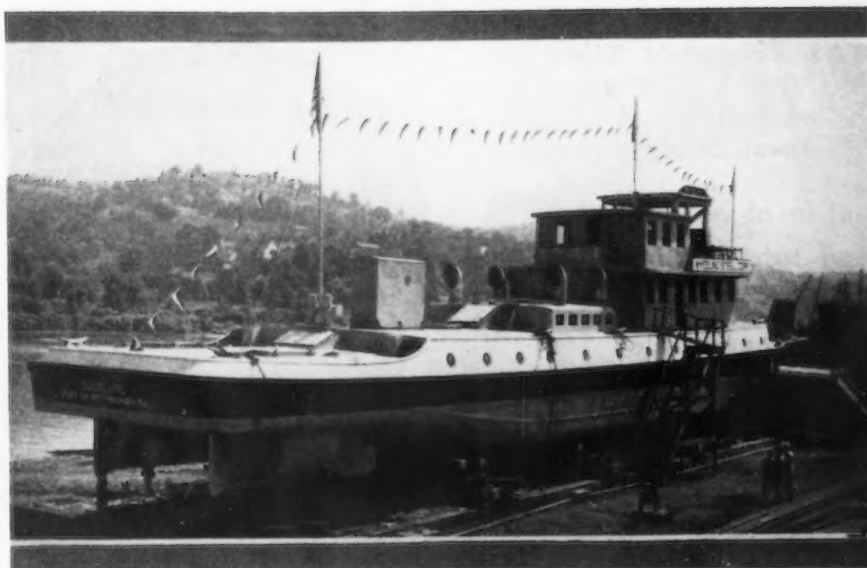
• • • Manufacture of automobiles, commercial vehicles, radios and electrical appliances for the home has ceased in Great Britain and industry is almost entirely engaged in armament production, according to A. C. Wickman, president, A. C. Wickman, Ltd., leading British machinery concern, and president of the British Hard Metals Association, here, in this country to expedite delivery of special equipment needed for armament production. It has not been possible, however, to convert automotive production equipment for the manufacture of shells or airplanes, although such equipment is being used for the production of trucks and ambulances. Aircraft production is being carried on in entirely new factories.

According to Mr. Wickman, British rearming did not get under way until late in 1935 and early 1936. At that time, 90 per cent of British production equipment was antiquated. Today, in contrast, not more than 30 to 40 per cent of Britain's industrial machinery is over 10 years old—compared with an estimated 70 per cent or more in the United States.

One of the keys to the rapid pick-up in British armament production in the past few years was the increasing availability of carbide cutting materials. With the use of these materials, Mr. Wickman said, production has been multiplied, on an average, four times for steel and six times for cast iron.

In England, as in Germany, he said, the machine tool industry uses carbides 100 per cent, while most modern machines are designed specifically for its use and the high-cutting speeds possible. "In the planning of cast iron machine beds, for instance," Mr. Wickman said, "the best machines you have here will cut at only 50 to 100 ft. a min. Over in England, with our new planing machines and carbide tools, we are planing beds at 250 ft. per min."

Other suggestions offered by Wickman along the lines of increasing machining efficiency in this country include increasing horsepower of machines in use and improving chip control.



A DIESEL TOWBOAT, "DUCTILLITE," built for Wheeling Steel Corp., was launched recently at the Neville Island (Pittsburgh) yard of Dravo Corp. When completed, this modern twin screw craft will serve its owner in the transportation of coal between the Harmarville mine and the Wheeling and Steubenville plants. The vessel is the first of the series of four tow boats of this design on Dravo's construction schedule. The hull is 135 ft. long, 27 ft. wide, and has molded depth of 11 ft. 9 in. The boat is powered by two Cooper-Bessemer full diesel engines, capable of developing a total of 760 hp. at 310 rpm.

the practical side of Springmaking—BY DUNBAR

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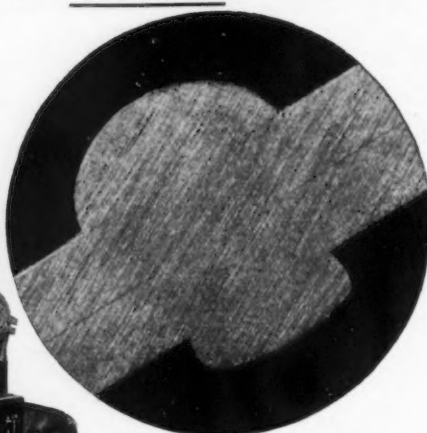
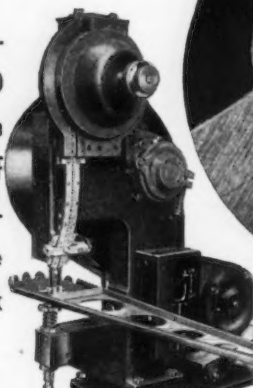
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rigid joints that won't loosen

a completely filled
hole
no flashing
a neat, balanced head

put in at an average rate of 1500 per hour. Approach to the maximum of 3200 per hour depends on the ease with which the work can be handled.



This is a $\frac{1}{4}$ " diameter rivet joint section — enlarged. You can see for yourself just how rigid these joints are. Send along two or three samples of your work, a handful of rivets and specify the type of riveted head required. They will be "RIVITORed" promptly and returned for your inspection.

the RIVITOR shown here setting aluminum alloy rivets in aircraft wing sections. Write for information on the RIVITOR'S use in the aircraft industry.

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38 SOUTH DEARBORN STREET CHICAGO, ILL.
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New Plate Glass Plant To Be Built in Toledo

Toledo

• • • Upon the site of one of the original plants of the old Edward Ford Plate Glass Co., dismantled when new methods of casting plate glass blanks came into use more than a decade ago, will blossom again a big new plate glass plant, it has been announced by Libbey-Owens-Ford Glass Co. No new financing will be involved in the construction program. Contract for the work has been let to the A. Bentley & Sons Co., general contractors. Toledo Engineering Co. will construct the new furnaces. Construction work will require about a year.

Detroit Company to Build \$150,000 Addition

Detroit

• • • Frederick Colman & Sons, Inc., manufacturer of tools, dies and special machinery for the automotive and aviation industries, has awarded contracts for the design and construction of a \$150,000 addition to its plant at 7250 Central Avenue, Detroit, to the Austin Co., Cleveland. The extension, 80 by 208 ft., will include die shop and offices.

Ferro Enamel Corp. to Make Synthetic Finishes

Cleveland

• • • Ferro Enamel Corp. has entered the synthetic finish field, according to Robert A. Weaver, president. Through a wholly-owned subsidiary, the Liquid Plastic Corp., the company will offer a line of "Vedoc" finishes for use on sheet metal products.

Ferro will continue to make porcelain enamels, started in 1920. L. S. O'Bannon will be in charge of manufacture of "Vedoc" finishes.

Pittsburgh Opens Center For Teaching Skilled Trades

• • • The Pittsburgh Chamber of Commerce this week announced a resident youth training center designed to instruct young men between 18 and 25 in skilled trades. The Pittsburgh center, to be followed by others throughout the country, will cost \$700,000.

Steel Company Earnings Climb

• • • National Steel Corp. reports net earnings after all charges of \$3,004,624 for the second quarter, equal to \$1.36 a share on capital stock. This compares with profits of \$4,009,193 in the first quarter and \$1,958,755 in the second quarter of 1939. Profit for the first six months

Willkie Sees Need Of Decentralization

• • • A decentralization of industry as part of the national defense program was advocated this week by Wendell Willkie in an address to agricultural leaders at Des Moines, Iowa. Mr. Willkie described industrial decentralization as one of the problems of America. This can be solved only by one "who understands productivity and the processes of American industry," he said.

totaled \$7,031,817, as against \$4,385,424 in the first half of 1939.

INLAND STEEL CO.'S net profits, after all deductions, for the quarter ended June 30, was \$2,873,655, as compared with \$3,059,844 in the preceding quarter and \$1,760,458 in the second quarter of 1939.

WHEELING STEEL CORP., reports net profit for the quarter ended June 30, after all charges, of \$1,019,426, compared with net profit of \$809,995 for the similar period in 1939.

PITTSBURGH STEEL CO. reports net profit, after all deductions, of \$176,400 for the quarter ended June 30, compared with net profit of \$203,008 for the first quarter of 1940.

NATIONAL SUPPLY CO., reports net profit of \$2,650,987 for the first six months of 1940, compared with a net loss of \$771,829 in the corresponding 1939 period.

CRUCIBLE STEEL CO. of America reports net earnings, after all deductions, of \$1,211,727 for the second quarter, against \$1,193,156 in the preceding quarter.

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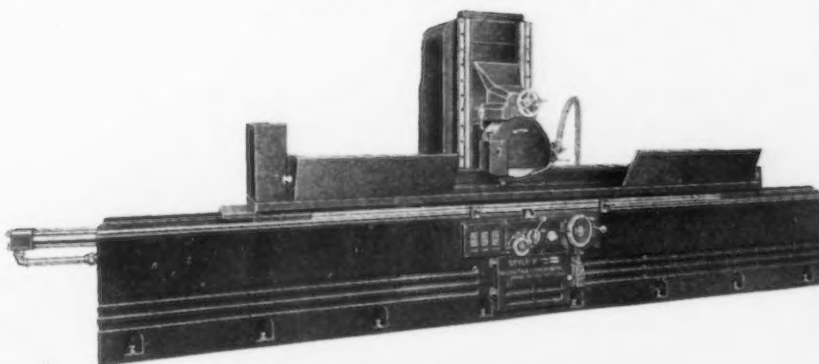
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Navy Department Awards

The Navy Department has announced the award of contracts to these companies:

The Timken Roller Bearing Co., Steel and Tube Division, Canton, Ohio, alloy steel bars, \$40,939.

National Tube Co., Pittsburgh, alloy steel tubing, \$28,415.

United Aircraft Corp., Pratt &

Whitney Aircraft division, East Hartford, Conn., sets of parts for engines, \$11,944.

Robins Dry Dock & Repair Co., New York, for conversion of U.S.S. Laramie, \$656,460.

Monarch Machine Tool Co., Sidney, Ohio, engine lathes, \$6,478.

Aldrich Pump Co., Allentown, Pa., centrifugal type pumps, \$6,691.

The Ajax Mfg. Co., Cleveland, forging, bolt and rivet machines, \$21,768.

Atlas Imperial Diesel Engine Co., Chicago, generator unit, \$9,824.

General Electric Co., Schenectady, N. Y., Diesel-Electric locomotive, \$18,800.

Bullard Co., Bridgeport, Conn., vertical turret lathes, \$26,142.

Grumman Aircraft Engineering Corp., Bethpage, L. I., N. Y., airplanes, \$694,700.

Collyer Insulated Wire Co., Pawtucket, R. I., copper wire, \$121,072.

Defoe Boat & Motor Works, Bay City, Mich., harbor tugs, \$786,078.

Robbins & Myers Inc., Springfield, Ohio, motor driven hoists, \$12,627.

Hardinge Bros., Inc., Elmira, N. Y., bench lathes, \$13,578.

E. J. Rooksby & Co., Philadelphia, boring bars, \$8,456.

Bethlehem Steel Co., New York, for conversion of U.S.S. Kaweah, \$614,296.

Government Contracts

... Federal contracts for iron and steel products, as reported for the week ended July 27 by the Labor Department's public contracts division, totaled \$1,240,624. For the same period contracts totaled \$1,193,060 for non-ferrous metals and alloys; and \$5,603,939 for machinery. Excluding orders for less than \$25,000, details follow:

Iron and Steel Products

Western Pipe & Steel Co. of Calif., San Francisco, buoys, \$109,742.

Carnegie-Illinois Steel Corp., Pittsburgh, steel, bar, \$76,091.

Doehler Die Casting Co., Pottstown, Pa., angle tubes, \$82,660.

The McKay Co., Pittsburgh, chains and fittings, \$123,728.

Leach Co., Oshkosh, Wis., reel unit, \$378,150.

Pacific Gear & Tool Works, Inc., Los Angeles, gate hoists, \$98,976.

Charles Mundt & Sons, Jersey City, N. J., tinplate, \$32,564.

The Colson Corp., Elyria, Ohio, stand assemblies, mounting, \$33,281.

Gilbert & Barker Mfg. Co., Springfield, Mass., water chests, \$28,685.

William Scrimgeour, Washington, D. C., seaplane ration equipment, \$25,479.

S. Blickman, Inc., Weehawken, N. J., coffee urns and tables, \$35,765.

Non-Ferrous Metals and Alloys

The International Nickel Co., Inc., alloy, nickel, \$31,800.

Bohn Aluminum & Brass Corp., Detroit, aluminum, alloy, \$116,345.

Kennecott Sales Corp., Perth Amboy, N. J., copper, \$32,250.

The American Brass Co., Waterbury, Conn., bands, gilding metal tubing, \$33,966.

Chase Brass & Copper Co., Inc., Waterbury, Conn., brass, \$118,417.

Scovill Mfg. Co., Waterbury, Conn., cartridge cases, \$115,744.

American Metal Co., Ltd., New York, copper, \$33,150.

International Silver Co., Meriden, Conn., silver-plated ware, \$86,676.

Bridgeport Brass Co., Bridgeport, Conn., cartridge cases, \$554,900.

Machinery

Fairbanks, Morse & Co., Beloit, Wis., propelling machinery, \$435,350.

Ingersoll-Rand Co., Athens, Pa., pneumatic tools, \$36,877.

Allis-Chalmers Mfg. Co., Milwaukee, tractors, \$44,381.

International Harvester Co., Inc., Milwaukee, tractors, \$35,367.

Caterpillar Tractor Co., Peoria, Ill., tractors, \$28,356.

Kearney & Trecker Corp., Milwaukee, milling machines, \$51,160.

The E. C. Brown Co., Rochester, N. Y., demustardizing apparatus, \$63,470.

Ex-Cell-O Corp., Detroit, shell turning machines, \$52,280.

Niles-Bement-Pond Co., Pratt & Whitney Div., West Hartford, Conn., radial drills, \$36,450.

The Heald Machine Co., Worcester, Mass., cylinder grinders, \$59,280.

Niles-Bement-Pond Co., Pratt & Whitney Div., West Hartford, Conn., lathes, \$87,995.

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling machines, \$49,206.

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling machines, \$78,850.

Brown & Sharpe Mfg. Co., Providence, milling machines, \$90,650.

Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn., lathes, precision, \$38,105.

E. C. Fuller Co., New York City, sewing machines, \$67,357.

Leland-Gifford Co., Worcester, Mass., drilling machines, \$25,951.

Browning Crane & Shovel Co., Cleveland, cranes, \$199,200.

Jones & Lamson Machine Co., Springfield, Vt., shell turning machines, \$41,461.

Fairbanks, Morse & Co., Chicago, propelling machinery, \$2,850,461.

Austin-Hastings Co., Inc., Cambridge, Mass., planers, \$51,837.

War Department Contracts

Washington—The War Department has awarded contracts to these companies:

Colt's Patent Fire Arms Mfg. Co., Hartford, weapons, \$2,455,660; Budd Wheel Co., Detroit, ammunition, \$1,737,000; Chicago Bridge & Iron Co., Birmingham, Ala., elevated steel tank, piping and accessories for MacDill Field, Tampa, Fla., \$39,175; American Locomotive Co., New York, gun carriages and limbers, \$1,427,296; York Safe & Lock Co., York, Pa., fuse setters with spare parts, \$121,797; The Galion Iron Works & Mfg. Co., Galion, Ohio, motorized road graders, \$235,351.

Le Roi Co., Milwaukee, motorized air compressors, \$1,203,520; Fairchild Aviation Corp., Jamaica, N. Y., stereoscopes with case, \$129,175; Mall Tool Co., Chicago, pneumatic band saws, \$121,000; Reed Prentice Corp., Worcester, Mass., pneumatic band saws, \$121,000; and the Caterpillar Tractor Co., Peoria, Ill., tractors and related equipment, \$67,531.

Pittsburgh and Youngstown Placed In "Area B" for Munitions Plants

Washington

••• Pittsburgh and Youngstown districts of the steel industry have been grouped in "Area B" in a list of five tentative geographical areas designated by the War Department as most suitable for the location and construction of new munitions plants under the \$500,000,000 available for the purpose. Area B includes Ohio, southwestern Pennsylvania, West Virginia, the western portions of Virginia, and eastern Kentucky.

Other areas, determined after considering the hazard from attack from the air, the proximity of existing munitions industries, and the adaptability of the area to particular type of munitions manufacture, have been designated as follows:

Area A—includes, roughly, northern Indiana, northern Illinois, southern Wisconsin and Minnesota, and Iowa, and thence westward.

Area C—includes southern Indiana and Illinois, western Kentucky, Missouri, eastern Kansas, and thence westward.

Area D—includes western North Carolina, northern Georgia and Alabama, and the eastern part of Tennessee.

Area E—includes the western part of Tennessee, northern Mississippi, Arkansas, northern Louisiana and Texas, Oklahoma, and westward.

War Department officials are working on designs and in some instances have agreed on sites for a few of the 60 plants to be erected either with direct government funds or with the aid of RFC loans. Aircraft plants are expected to be financed largely through RFC loans while other facilities generally will be constructed by and title vested in the government. All plants will be privately operated, according to present plans.

In arriving at the designated areas, the War Department decided that the plants should be placed within an area from 200 to 250 miles from United States geographic boundaries, but exceptions may be made after careful consideration.

Mid-West Shippers Will Need More Cars

Chicago

••• The Mid-West Shippers Advisory Board announced last week that it now expects that 892,810 cars will be required by Middle Western shippers in the third quarter of this year as compared with their estimate on June 21 of 873,065 cars. Upward revisions were made in the following commodities: coal and coke, grain, iron and steel, and paper, paper board and roofing.

June Steel Imports Drop To 5504 Tons

••• In June iron and steel imports (excluding scrap) fell to 5504 gross tons, valued at \$530,343, from 7726 tons valued at \$544,608 imported in May, according to the metals and minerals division of the Bureau of Foreign and Domestic Commerce. In June, 1939, this trade had amounted to 30,050 tons valued at \$1,487,504.

Scrap imports in June totaled but one ton, with a value of \$9. Scrap imports in May were 33 tons valued at \$895, and in June, 1939, had totaled 2537 tons valued at \$23,745. The one ton was furnished by New Zealand.

Armstrong Blum Will Expand Chicago Plant

Chicago

••• The Armstrong Blum Mfg. Co. has awarded a contract to the Austin Co., Cleveland, for an extension to its Chicago plant which will more than double the size of the present manufacturing area and will increase plant capacity by 80 per cent. The new addition will include 42,000 sq. ft. of floor space, giving the entire plant an area of 77,620 sq. ft.

"Mike" Tighe, Veteran Union Leader, Is Dead

Pittsburgh

••• Michael F. Tighe, for 17 years president of the Amalgamated Association of Iron, Steel & Tin Workers until his retirement four years ago, died at Pittsburgh this week at the age of 82. He had been a leader in the labor movement in the United States for more than 57 years and enjoyed the respect and confidence of many steel executives, union labor and non-union labor. He is remembered in the steel trade for his ability to keep strikes at a minimum through his level headedness in negotiating grievances.

Mr. Tighe started to work when he was only eight years old at 33½¢ a day and bed. He became a puddler's helper when he was 21. He soon entered union organization work following in the footsteps of his father who was a strong union man. Mr. Tighe stepped down from the leadership of the steel union several years ago when the CIO formed the Steel Workers Organizing Committee.

Steel Mission From Brazil Reaches U. S.

••• Three members of the executive commission of the National Steel Plan of Brazil, an organization set up by the Brazilian government to establish a steel industry in that country, arrived in the United States this week and are to visit various steel-producing centers.

Guilherme Guinle, head of the mission and a member of one of Brazil's leading industrial families, said in New York that a steel plant with an initial capacity of 300,000 tons of ingots annually is planned.

Mr. Guinle, with Lieut. Col. Edmundo de Macedo Soares e Silva, and Ary F. Torres will confer with Export-Import Bank officials at Washington regarding erection of the plant, obtaining of equipment, and obtaining of technical aid. The bank has agreed to grant the Brazilian government a \$10,000,000 credit provided that government meets certain conditions.

Republic's Witherbee Ore Lease Modified

• • • At a special meeting of the stockholders of Witherbee Sherman Corp., owner of a magnetite iron ore mine at Port Henry, N. Y., which has been mined for about a century, authority was given the management to modify the terms of the lease now in existence with Republic Steel Corp. so that Republic will get the benefit of lower rates.

The existing lease was entered into May 1, 1938, and expires in 1963. The present lease provided for original royalties at 70c. a ton through 1939 and thereafter at 55c. a ton. The new rates will be 55c. a ton up to 500,000 tons a year, 30c. a ton for ore in excess of 500,000 tons and up to a million tons a year, and 25c. a ton for all ore in excess of a million tons a year.

It is contemplated that Republic will make heavy capital expenditures to permit the taking of more ore than it had used previously, and the figure talked of is a million and a half tons a year. It is because of these additional capital expenditures that Republic has asked for a concession in rates to warrant making the capital expenditure.

Bastian-Blessing Co. To Build \$500,000 Plant

Chicago

• • • The Bastian-Blessing Co. has purchased a 13-acre site on the far northwest side of this city for a contemplated \$500,000 manufacturing plant. A one story completely air-conditioned structure containing about 165,000 sq. ft. of floor space is being planned. The present Chicago plant will be leased to other companies after the completion of the new structure around the first of the year.

Propelling Machinery For Submarines Ordered

Chicago

• • • With the award last week to Fairbanks, Morse & Co. of a \$1,435,350 order for propelling machinery for submarines, the total amount of contracts for this company for such machinery was increased to over \$5,000,000 since last September.

British Are Still Seizing Contraband

London

• • • The quantity of goods seized by the British Contraband Control since the beginning of the war is stated by the Ministry of Economic Warfare to total 700,000 tons. A substantial proportion of this total is made up of iron, steel and ores.

Between July 7 and 15 approximately 10,000 tons were stopped as suspected of being destined for the enemy. The seized cargoes included 2300 tons of metals. In addition, between July 1 and 16 there were taken from Italian vessels 700 tons of iron and steel.

Bids Are Sought on Submarine Machinery

Washington

• • • The Navy Department on Monday invited bids for Aug. 14, on 24 sets of propelling machinery for as many submarines now under construction. At the same time the Navy announced the award of a \$1,210,000 contract to McCloskey & Co., Philadelphia, for the construction of additional buildings and accessories at the Annapolis (Md.) Naval Academy. The War Department on Monday awarded a \$7,060,650 contract to the Sperry Gyroscope Co., Inc., Brooklyn, for "Military equipment."

SWOC Outlaw Strike At Donora Called Off

Donora, Pa.

• • • The outlaw strike participated in here recently by 300 SWOC furnace workers at the American Steel & Wire Co.'s Zinc works, was called off early this week. The men struck over a request for additional workmen to be assigned to speling furnaces. The strike was in violation of the company's agreement with the union which called for such grievances to be taken up in a routine manner. The controversy is expected to be settled through grievance machinery to be set up by the contract.

G-M Elects McCuen A Vice-President

Detroit

• • • Major shifts in General Motors Corp. executive personnel were announced Monday by Alfred P. Sloan, Jr., chairman of the board. Harlow W. Curtice, general manager of Buick, was elected a director of the company to succeed Seward Prosser, resigned, and C. K. McCuen, general manager of the Olds Motor Works division, was elected a vice-president and transferred to the central office, Detroit, in charge of engineering activities.

S. E. Skinner, general manager of the Ternstedt Manufacturing division, was named to succeed McCuen as Olds general manager. J. W. Jackson, works manager of Ternstedt, becomes general manager.

F. C. Kroeger, general manager of the Delco-Remy division, was made general manager of the Allison division, being succeeded by O. V. Badgley, factory manager of Delco-Remy. Sloan also announced the election of O. E. Hunt, vice-president, to be a member of the corporation's policy committee.

Aetna-Standard Gets \$1,700,000 Gun-Part Contract

Youngstown

• • • With receipt of a new contract for an additional \$1,700,000 of anti-aircraft gun carriages for the War Department, Aetna-Standard Engineering Co. now has on its books national defense orders totaling around \$5,000,000. The company is expanding its plant space at Ellwood City, Pa., where the gun carriages will be produced. Plant and machinery additions are reported being financed with government loans.

Submarine Net Tenders To Be Built at Cleveland

Cleveland

• • • American Shipbuilding Co., which recently received a \$6,500,000 contract for building anti-submarine net tenders, will require around 4000 tons of plates and shapes. Six of these vessels will be built at Cleveland, the others at Lorain and Chicago.

July Steel Output Higher at 5,595,070 Tons

• • • A total of 5,595,070 net tons of open-hearth and Bessemer steel ingots was produced by the steel industry during July, according to the monthly report of the American Iron and Steel Institute.

The total for last month was slightly greater than the June output of 5,532,910 tons despite the holiday and vacation shutdowns during July and was 57 per cent above the July, 1939, output of 3,564,827 tons.

	Reported Production (Net Tons)		Calculated Production* All Companies		Number of Weeks	% Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
1939						
January	3,344,830	165,193	3,578,863	807,870	4.43	52.83
February	3,085,746	219,728	3,368,915	842,229	4.00	55.07
March	3,547,915	218,057	3,839,127	866,620	4.43	56.67
1st Quarter	9,978,491	602,978	10,786,905	838,795	12.86	54.85
April	3,059,225	230,464	3,352,774	781,532	4.29	51.11
May	3,041,853	190,575	3,295,164	743,829	4.43	48.64
June	3,246,378	209,975	3,523,880	821,417	4.29	53.71
2nd Quarter	9,347,456	631,014	10,171,818	781,846	13.01	51.13
1st 6 Months	19,325,947	1,233,992	20,958,723	810,155	25.87	52.98
July	3,241,186	256,906	3,564,827	806,522	4.42	52.71
August	3,885,787	276,586	4,241,994	957,561	4.43	62.62
September	4,347,352	332,783	4,769,468	1,114,362	4.28	72.87
3rd Quarter	11,474,325	866,275	12,576,289	957,829	13.13	62.63
9 Months	30,800,272	2,100,267	33,535,012	859,872	39.00	56.23
October	5,512,718	453,600	6,080,177	1,372,500	4.43	89.75
November	5,589,235	453,103	6,147,783	1,433,050	4.29	93.71
December	5,358,320	353,250	5,822,014	1,317,198	4.42	86.13
4th Quarter	16,460,273	1,259,953	18,049,974	1,373,666	13.14	89.83
Total	47,260,545	3,360,220	51,584,986	989,355	52.14	64.70
1940						
January	5,262,760	285,714	5,655,315	1,276,595	4.43	84.11
February	4,113,446	205,527	4,409,035	1,064,984	4.14	70.16
March	3,990,510	191,559	4,264,755	962,699	4.43	63.42
1st Quarter	13,369,285	682,800	14,329,105	1,102,239	13.00	72.62
April	3,721,264	176,335	3,974,706	926,505	4.29	62.04
May	4,489,665	258,709	4,841,403	1,092,867	4.43	72.00
June	5,122,390	304,381	5,532,910	1,289,723	4.29	84.97
2nd Quarter	13,333,319	739,425	14,349,019	1,102,922	13.01	72.66
1st 6 Months	26,702,604	1,422,225	28,678,124	1,102,581	26.01	72.64
July	5,165,672	322,362	5,532,910	1,289,723	4.42	83.40

*Revised.

Miller New Purchasing Director for U. S. Steel

• • • Charles R. Miller, Jr., has been appointed director of purchases, U. S. Steel Corp. of Delaware, with headquarters at Pittsburgh. Mr. Miller, who was purchasing agent, Pittsburgh district, Carnegie-Illinois Steel Corp., before his latest promotion, has taken over the duties of Charles H. Rhodes, vice-president of purchases, U. S. Steel Corp. of Delaware, who recently was transferred to Chicago. Mr. Miller joined the old Carnegie Steel Co. as office boy in 1897 and on May 1, 1918, was made purchasing agent. When the consolidation of Carnegie Steel Co. and Illinois Steel Co. was made in 1935, Mr. Miller became purchasing agent for the Pittsburgh district.

NAM Urges 5-Yr. Amortization For New Defense Plants

• • • Enactment of an adequate amortization formula, to permit manufacturers to write off in five years the cost of facilities made necessary to fill defense orders, without waiting for Congressional action on an excess profits tax was recommended last week by the National Association of Manufacturers.

Describing a 5-year basis for allowing a tentative amortization deduction to be taken in each year at the rate of 20 per cent of the cost of special defense facilities as "fair and reasonable," the association criticized as "too difficult to determine" the practice followed in prior rulings of computing usable value at the end of the taxable period.

Machine Tool Export

License Rules Relaxed

Washington

• • • An order relaxing and clarifying the export licensing system governing machine tools has been issued by the State Department's Division of Controls and sent to collectors of customs. Machine tool experts on the staff of the National Defense Advisory Commission said that the order, recommended by Lieut. Col. Russell L. Maxwell, administrator of export control, was issued after ascertaining the items for which there is adequate capacity so that the defense program would not be impaired.

Pending further instructions, these items have been freed from the machine tool export restriction:

All used or rebuilt machine tools of any description; pipe threading machines; metal cutting band saws; power driven hack saws; key-seating machines; disc grinding machines; car wheel and locomotive wheel presses; burring machines—gear; burnishing machines—gear; planers—crank; bench power presses; saw sharpening machines; filing machines; pipe bending machines; thread chaser grinders; burnishing machines; tool and cutter grinders—universal and plain—hand feed; riveting machines; grinding machines—portable with flexible shaft; centering machines; grinders—face milling cutter; arbor presses—hand, air and hydraulic; grinding machines—drill; grinding machines—tap; grinding machines—hob; nibbling machines; grinders—lathe tool; gear lapping machines; gear shaving machines; polishing machines; heat treating furnaces; foundry machines.

Earlier, the State Department had specifically exempted these articles from the machine tool license requirements: (1) portable tools driven by fractional horsepower motors or by compressed air; (2) brakes, rolls, shears, small punches, if hand operated; (3) repair parts for machine tools, other than important sub-assemblies, in quantities not sufficient to constitute a substantially complete metal working machine; and (4) small tools, such as cutters, drills, taps, and grinding wheels.

• **John A. Brown**, has retired from Heppenstall Co., Pittsburgh, upon completion of 40 years service. For the past 10 years he was special service representative calling on the trade in the interest of the company's shear knife business.

• **Harry E. Reith** has been appointed to the position previously held by Mr. Brown. He formerly was with Brooks Oil Co. and served as master mechanic during the construction of Jones & Laughlin's 96-in. continuous strip mill.

• **George I. Allen**, manager of Heppenstall's Cleveland office, has retired after service of 27 years and will be succeeded by his son, **Jack R. Allen**, a graduate of Case School of Applied Science.

• **LaMar J. Vieau** has been appointed general sales manager of the tin plate division of McKeesport Tin Plate Corp., McKeesport, Pa.

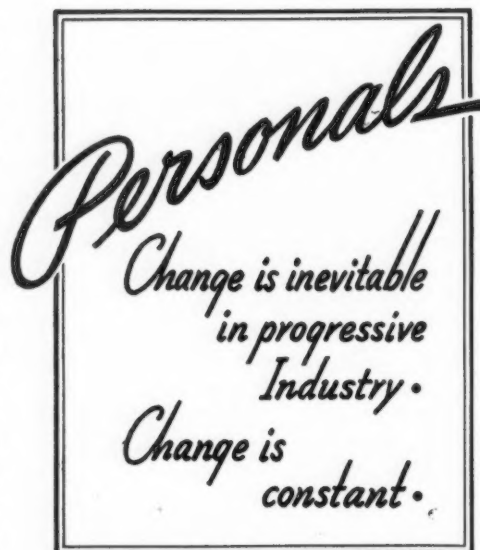
• **Roy F. Lab**, previously identified with the United Alloy Steel Co., Central Alloy Steel Co., and Republic Steel Corp., is now chief chemist at the new plant at Warren, Ohio, of Copperweld Steel Co., Glassport, Pa.

• **Thomas Breene**, who has been associated with Salem Engineering Co., Ltd., London, England, has recently returned to this country and will be associated with the sales department in the home office at Salem, Ohio.

• **J. V. McCartney**, who recently returned to this country from the London office of H. A. Brassert & Co., has joined the New York organization of the company. He was chief engineer in the London office, in charge of the steel works development at Karabuk, Turkey.

• **Ralph F. Hess**, production manager of the North American Refractories Co., Cleveland, since 1929, has been elected vice-president in charge of operations. Howard H. Hopwood, sales manager since 1936, has been elected vice-president and general sales manager, and Stephen M. Swain, who has been chief ceramic engineer, has been made director of research.

• **Roderick M. Ladd** has joined the New York sales staff of the Hooker Electrochemical Co., Niagara Falls, N. Y.



• **Frank H. Gordon**, vice-president in charge of sales of the Lukens Steel Co., Coatesville, Pa., on July 25 celebrated the 45th anniversary of his service with that company, a record which is in keeping with the long existence of the Lukens company, one of the pioneer steel companies of the United States. Mr. Gordon joined the Lukens office in Coatesville as an errand boy after graduation from high school in 1895. From errand boy he advanced to clerical work in the sales department, and in 1903 was made assistant general sales agent. Upon the retirement of J. R. Van Ormer, the general sales agent in 1907, Mr. Gordon succeeded him. In 1928 he was elected vice-presi-



FRANK H. GORDON, vice-president in charge of sales of Lukens Steel Co., who celebrated his 45th anniversary with the company on July 25.

dent in charge of sales and a director of the company. He is also a director of Lukenweld, Inc., and By-Products Steel Corp., both subsidiaries of Lukens Steel Co.

• **James H. Jewell** has been appointed manager of agency sales, Westinghouse Electric & Mfg. Co., East Pittsburgh, this department being responsible for the company's apparatus products sold through distributors. Mr. Jewell enrolled in the Westinghouse graduate student course in 1920 and after completing the course in 1922 was in the small motor section. He soon went to the Philadelphia office as sales assistant, later became a salesman in the building section and in 1930 was made manager of the construction industry section. He returned to East Pittsburgh in 1938 as manager of public works and communications section and later was transferred to Philadelphia as manager of agency sales, Middle Atlantic district. In 1939 Mr. Jewell returned to East Pittsburgh as assistant manager of the agency sales department, which position he held until the present time.

• **Charles J. Marks** has been appointed chief tool engineer of United Aircraft Corp., East Hartford, Conn. Arthur A. Merry and Frederick L. Woodcock have been made chief tool engineer at Pratt & Whitney Aircraft division and Hamilton Standard Propellers division, respectively.

Mr. Marks has had a long experience in the production of aeronautical engines. At 23 he assumed charge of all foreign tool and die work for the E. W. Bliss Co. In 1903, he became toolroom foreman for the old Simplex Automobile Co. (later the Wright-Martin Corp.), of which he was general superintendent. When that firm was building aircraft engines during the World War, Mr. Marks was made process engineer. He was later made production engineer of the Wright Aeronautical Corp., resigning in 1925 to take a similar post with Pratt & Whitney.

Mr. Merry started his career in a GE apprentice course and was formerly production manager of the Pratt & Whitney Co. in Hartford during the World War. More recently he has been affiliated with the Bucyrus-Erie Co., the Carbology

Co., and the Ex-Cell-O Corp. He has been assistant production engineer of Pratt & Whitney for the past two months.

Mr. Woodcock, who became associated with the Hamilton Standard Propeller division in 1936, was in charge of tool designing prior to his promotion to the position of chief tool engineer. His experience has included service as chief engineer of the cutting-tool department at Pratt & Whitney and executive service with the Brown & Sharpe Mfg. Co. and the Morse Twist Drill Co.

- **R. G. Justus** has been appointed manager of industrial sales for the Westinghouse Air Brake Co., at Wilmerding, Pa. He entered the employ of the Air Brake company in 1911 as clerk at the St. Louis office, and was later promoted to industrial representative. Since 1932 he has been representative in the Southwestern district, handling not only industrial business but also important commercial negotiations with railway properties.

- **M. A. Carpenter**, secretary and director of sales for the Falk Corp., Milwaukee, has been elected executive vice-president and a director of the company, in which capacity he will continue to head the sales and advertising departments. He has been with Falk for the past 16 years, starting in the advertising department, and has held the positions of advertising manager, sales promotion manager and sales manager.

- **Arthur H. Rice**, Washington, has been named assistant to the president of the new Williams Aircraft Corp., now under development at Toledo.

- **Frank Purnell**, president, Youngstown Sheet & Tube Co., has been elected a director of the United States Chamber of Commerce, to fill a vacancy. His term will expire in 1942.

- **Frank S. Austin** has been appointed purchasing agent of the New York Central, the Indiana Harbor Belt Line and Chicago River & Indiana railroads, succeeding the late Charles C. Warne.

- **Frank W. Ladky**, who has represented the Corey Steel Co., Cicero, Ill., in the Milwaukee area for the

past 20 years and also served as district manager for the Allegheny-Ludlum Steel Corp., Pittsburgh, has been elected a director of the Corey firm.

- **George E. Long**, former general manager of the Koehring Co., Milwaukee, has been elected president to succeed **W. J. Koehring**, who has resigned but will continue his interest in the business as the largest stockholder. **Peter P. Graser** has been elected secretary and treasurer, and **C. A. Koehring** will continue to serve as vice-president in charge of sales.

Obituary

- **John Lowell Fyke**, general superintendent of the electrical and steam turbine shops of the Allis-Chalmers Mfg. Co., Milwaukee, died suddenly at his home in Milwaukee, July 24, at the age of 55. He entered the employ of the company at the Norwood Bullock works in 1905 after graduating from Ohio State University as electrical engineer. A year later he was transferred to the Milwaukee plant where he held the positions of electrical department foreman, inspector and assistant superintendent of various electrical shops until 1935 when he was appointed to his late position. He was a member of the company's labor advisory committee.

- **Fred C. Reif**, secretary of the Boye & Emmes Machine Co., Cincinnati, died on July 23 after a long illness. He was 63 years old. A native of Cincinnati, Mr. Reif had been connected with the tool company since 1908.

- **Jerome J. Kelly**, sales engineer for the B. F. Sturtevant Co. in Milwaukee for many years, died at Bloomer, Wis., July 20, of a heart ailment after a week's illness.

- **O. W. Buening**, vice-president in charge of manufacture of the Westinghouse Air Brake Co., and the Union Switch & Signal Co., died suddenly at Lewes, Del., while vacationing at Rehoboth Beach. He had been identified with the Air Brake company since his

graduation from Purdue University in 1901. He became general superintendent of the Wilmerding plant in 1907, works manager 10 years later. He was elected vice-president in charge of manufacture 10 years ago. He was at one time vice-president of the Army Ordnance Association of Pittsburgh and subsequently vice-president of the National Association of Manufacturers.

- **Donald M. Smith**, assistant district sales manager, Allegheny Ludlum Steel Corp.'s Chicago office, died at his home in Chicago on June 21. Prior to the merger with Ludlum, Mr. Smith was district sales manager for the Allegheny Steel Co.

- **Fred C. Gardner**, secretary-treasurer of E. C. Atkins & Co., Indianapolis, Ind., died at his home in that city on July 28, aged 78 years. He had been identified with the company for 59 years and had been secretary-treasurer since 1900.

- **T. W. Lux**, who had been associated with the Acme Steel Co., Chicago, since 1913, died after a long illness on July 25, aged 60 years.

- **Edwin D. Gurney**, pioneer manufacturer of heaters and radiators and from 1875 to 1912 operator of the Central Iron Foundry, East Boston, died at his home in Brookline, Mass., on July 28, aged 81 years.

- **Karl W. Johnson**, president of the Commonwealth Screw Co., died at his home in Worcester, Mass., July 31. He was 79 years old and co-author of "The History of the Swedish-Finnish People of Worcester."

- **George Warrington Putnam**, a foreman in the L. S. Starrett Co., Athol, Mass., for 50 years, died at his home in Athol, July 31, aged 83 years.

- **Frank A. Chapper, Sr.**, president of the Frank A. Chapper Iron Works for 40 years, was buried Monday, July 29, at Detroit. Mr. Chapper, who was 74 years old, died after an illness of several months. He retired from active business 25 years ago but had retained the presidency of the Chapper works.

EXPORTS MORE THAN 10% OF STEEL SOLD IN FIRST HALF

Exports of steel constituted more than 10 per cent of the total amount of semi-finished steel and finished produced for sale in the first six months of 1940, according to figures released by the American Iron and Steel Institute and shown in the accompanying table. Total exports in the half year were 2,752,775 net tons. Total production for sale of all steel was 20,657,771 net tons, including 1,101,691 tons sold to members of the industry for further conversion.

In June the exports amounted to 601,668 tons, which

was far above the monthly average of the first half. Ingots, billets and other semi-finished forms constituted the largest part of first half exports. These items totaled 720,553 tons. Bars came next with 400,303 tons, then sheets with 398,348 tons, while tin plate totaled 289,129 tons, not including untinned black plate.

Total steel produced for sale in June was 3,802,485 tons, including 252,141 tons sold to members of the industry for further conversion.

AMERICAN IRON AND STEEL INSTITUTE													
Capacity and Production for Sale of Iron and Steel Products													
June - 1940													
	Number of companies	Items	Annual Capacity Net tons	PRODUCTION FOR SALE—NET TONS									
				Current Month				To Date (6 Months 1940)					
				Total	Per cent of capacity	Export	To members of the industry for conversion into further finished products	Total	Per Cent of capacity	Export	To members of the industry for conversion into further finished products		
STEEL PRODUCTS	Ingots, blooms, billets, slabs, sheet bars, etc.	33	1	xxxxxxx	454,232	xxx	211,236	128,125	2,026,968	xxx	720,553	518,516	
	Heavy structural shapes	8	2	5,205,300	234,451	54.9	21,287	xxxxxxx	1,154,775	44.6	98,366	xxxxxxx	
	Steel piling	4	3	328,000	16,306	60.6	912	xxxxxxx	79,002	48.4	7,897	xxxxxxx	
	Plates—Sheared and Universal	19	4	5,855,450	317,981	66.2	47,394	613	1,721,337	59.1	225,912	10,386	
	Skelp	7	5	xxxxxxx	83,214	xxx	14,215	32,780	292,114	xxx	40,632	117,984	
	Rails—Standard (over 60 lbs.)	4	6	3,647,600	120,235	40.2	383	xxxxxxx	906,577	50.0	41,873	xxxxxxx	
	Light (60 lbs. and under)	6	7	306,800	10,215	40.6	2,188	xxxxxxx	50,783	33.3	15,789	xxxxxxx	
	All other (Incl. girder, guard, etc.)	2	8	118,000	398	4.1	76	xxxxxxx	16,500	28.1	2,382	xxxxxxx	
	Splice bar and tie plates	15	9	1,300,200	41,150	38.6	221	xxxxxxx	314,059	48.6	4,545	xxxxxxx	
	Bars—Merchant	35	10	xxxxxxx	352,242	xxx	57,604	26,504	1,939,675	xxx	211,454	150,332	
	Concrete reinforcing—New billet	15	11	xxxxxxx	126,031	xxx	22,326	xxxxxxx	560,615	xxx	144,396	xxxxxxx	
	Rerolling	18	12	xxxxxxx	14,453	xxx	392	xxxxxxx	68,621	xxx	4,258	xxxxxxx	
	Cold finished—Carbon	18	13	xxxxxxx	47,815	xxx	1,429	xxxxxxx	303,303	xxx	6,971	xxxxxxx	
	Alloy—Hot rolled	15	14	xxxxxxx	69,590	xxx	7,868	4,070	409,656	xxx	27,530	27,381	
	Cold finished	14	15	xxxxxxx	5,884	xxx	261	xxxxxxx	42,633	xxx	1,360	xxxxxxx	
	Hoops and baling bands	5	16	xxxxxxx	9,227	xxx	1,369	xxxxxxx	45,637	xxx	4,334	xxxxxxx	
	TOTAL BARS	53	17	12,372,465	625,242	61.6	91,249	30,574	3,370,140	54.8	400,303	177,713	
	Tool steel bars (rolled and forged)	15	18	xxxxxxx	110,220	xxx	5,864	462	xxxxxxx	32,882	60.0	2,389	xxxxxxx
	Pipe and tube—B. W.	13	19	1,815,860	92,795	62.3	6,905	xxxxxxx	435,995	48.3	40,217	xxxxxxx	
	L. W.	10	20	1,246,340	33,004	32.3	2,442	xxxxxxx	158,327	25.5	17,786	xxxxxxx	
	Electric weld	5	21	731,520	26,655	44.4	2,349	xxxxxxx	119,206	32.8	12,591	xxxxxxx	
	Seamless	15	22	3,159,840	147,073	56.7	13,918	xxxxxxx	850,703	54.1	87,636	xxxxxxx	
	Conduit	6	23	151,145	5,771	46.5	54	xxxxxxx	31,777	42.3	810	xxxxxxx	
	Mechanical Tubing	13	24	554,825	19,276	42.3	2,125	xxxxxxx	128,217	46.4	7,559	xxxxxxx	
	Wire rods	19	25	xxxxxxx	95,987	xxx	28,360	16,531	437,556	xxx	127,690	79,094	
	Wire—Drawn	37	26	2,255,210	110,870	59.9	13,392	594	653,068	58.2	82,327	5,260	
	Nails and staples	19	27	1,091,690	53,698	59.9	6,532	xxxxxxx	279,565	51.5	33,352	xxxxxxx	
	Barbed and twisted	16	28	438,270	22,785	63.4	6,938	xxxxxxx	101,423	46.5	20,159	xxxxxxx	
	Woven wire fence	15	29	772,790	29,404	40.1	232	xxxxxxx	129,323	33.6	1,210	xxxxxxx	
	Bale ties	11	30	119,050	7,354	75.3	30	xxxxxxx	30,167	50.9	143	xxxxxxx	
	All other wire products	6	31	27,030	1,056	47.6	-	xxxxxxx	6,225	46.3	-	xxxxxxx	
	Fence posts	13	32	147,485	6,009	49.7	79	xxxxxxx	28,207	38.4	443	xxxxxxx	
	Black plate	12	33	653,295	31,666	59.1	11,307	5,221	188,498	58.0	19,175	55,293	
	Tin plate—Hot rolled	9	34	1,201,960	38,029	38.6	3,631	xxxxxxx	257,728	43.1	62,560	xxxxxxx	
	Cold reduced	10	35	2,930,860	206,134	85.7	35,501	xxxxxxx	1,168,001	80.1	226,569	xxxxxxx	
	Sheets—Hot rolled	26	36	xxxxxxx	454,157	xxx	47,955	25,439	2,484,383	xxx	255,772	69,914	
	Galvanized	16	37	xxxxxxx	118,155	xxx	11,575	xxxxxxx	618,410	xxx	84,633	xxxxxxx	
	Cold rolled	18	38	xxxxxxx	159,680	xxx	8,078	xxxxxxx	1,068,450	xxx	45,341	xxxxxxx	
	All other	15	39	xxxxxxx	42,001	xxx	2,020	xxxxxxx	274,593	xxx	12,602	xxxxxxx	
	TOTAL SHEETS	27	40	13,255,610	773,993	71.2	69,628	25,439	4,445,836	67.4	398,348	69,914	
	Strip—Hot rolled	24	41	3,525,110	116,737	40.4	6,753	12,264	664,320	37.9	38,498	67,531	
	Cold rolled	35	42	1,313,360	56,463	52.4	1,583	xxxxxxx	330,632	50.6	8,693	xxxxxxx	
	Wheels (car, rolled steel)	5	43	419,035	8,593	25.0	70	xxxxxxx	94,292	45.2	2,332	xxxxxxx	
	Axles	5	44	472,280	5,277	13.6	91	xxxxxxx	41,279	17.6	1,718	xxxxxxx	
	Track spikes	11	45	327,275	8,284	30.8	125	xxxxxxx	57,476	33.3	2,318	xxxxxxx	
	All other	3	46	9,100	284	38.0	-	xxxxxxx	4,813	106.3	-	xxxxxxx	
	TOTAL STEEL PRODUCTS	133	47	xxxxxxx	3,802,485	xxx	601,668	252,141	20,657,771	xxx	2,752,775	1,101,691	
Estimated total steel finishing capacity based on a yield from ingots of 68.9 %				-	48	53,714,800	xxxxxxx	80.5	xxxxxxx	xxxxxxx	73.2	xxxxxxx	xxxxxxx
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	27	49	xxxxxxx	448,870	xxx	42,200	145,599	2,547,501	xxx	177,423	651,029	
	Ingots moulds	4	50	xxxxxxx	40,966	xxx	359	xxxxxxx	196,562	xxx	1,536	xxxxxxx	
	Bars	10	51	160,600	2,224	16.9	8	275	13,713	17.2	94	1,167	
	Pipe and tubes	3	52	109,377	3,373	37.6	81	xxxxxxx	17,613	32.4	541	xxxxxxx	
	All other	2	53	71,180	877	15.0	149	267	5,892	16.6	998	1,644	
TOTAL IRON PRODUCTS (ITEMS 51 to 53)				12	54	276,247	6,474	238	542	37,218	27.1	1,633	2,811

Total number of companies included - 153

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current month 3,550,344 N.T.: 80.5 % of Finishing Capacity.
To date 19,556,080 N.T.: 73.2 % of Finishing Capacity.
The above tonnages represent 68.9 % of the ingots produced by companies whose products are included above.

Daily Output Rises 2.7% to Highest Tonnage This Year

PRODUCTION of coke pig iron in July totaled 4,053,945 net tons, the highest tonnage reached this year, and compares with 3,818,897 tons in June. On a daily basis the gain in July production was 2.7 per cent over that in June, or from 127,297 tons to 130,772 tons in July. The operating rate for the industry was 86.3 per cent, against 83.9 per cent the previous month and 55.8 per cent in July last year.

There were 187 furnaces in blast on Aug. 1, operating at the rate of 131,760 net tons a day, compared with 182 on July 1, making 131,360 tons. The United

Production Total for July Totals 4,053,945 Tons. Operating Rate for Industry Averages 86.3%

States Steel Corp. blew in three furnaces and took one off blast, independent producers blew out or banked one furnace and merchant producers put in five furnaces and blew one out for relining.

Among the furnaces blown in were: One Troy, of the Troy Furnace Corp. (leased by Republic); one Mystic Iron Works furnace;

one Monongahela, National Tube Co.; one Gary, Carnegie-Illinois Steel Corp.; one Ensley, Tennessee Coal, Iron & Railroad Co.; one Anna, Struthers Iron & Steel Co.; one Sharpville, Pittsburgh Coke & Iron Co., and one Toledo, Interlake Iron Corp.

Furnaces blown out or banked included One Oriskany, E. J. Lavino & Co.; one Campbell, Youngstown Sheet & Tube Co., and one Gary, Carnegie-Illinois Steel Corp.

The number of available furnaces has been reduced to 235 from 236 by the abandonment of Steelton E furnace of Bethlehem Steel Co.

Production of Coke Pig Iron and Ferromanganese

(All Figures in Net Tons)

	Pig Iron*		Ferromanganese†	
	1940	1939	1940	1939
January..	4,032,022	2,436,474	43,240	23,302
February..	3,311,480	2,307,409	38,720	20,894
March ..	3,270,499	2,681,969	46,260	17,928
April ..	3,137,019	2,302,918	43,384	12,900
May	3,513,683	1,923,618	44,973	8,835
June	3,818,897	2,372,665	44,631	18,611
½ year..	21,083,600	14,025,053	261,208	102,470
July	4,053,945	2,639,022	43,341	23,758
August ..	.....	2,978,991	.....	23,103
September ..	.....	3,223,983	.....	24,583
October ..	.....	4,062,901	.....	26,817
November ..	.....	4,166,888	.....	33,999
December ..	.....	4,220,536	.....	40,654
Year .....	.....	35,317,374	.....	275,384

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	1940	% Capacity	1939	% Capacity	1938
January..	130,061	85.8	78,596	51.5	51,632
February..	114,189	75.1	82,407	54.0	51,931
March ..	105,500	68.9	86,516	56.8	52,476
April ..	101,567	68.6	76,764	50.4	51,376
May	113,345	74.8	62,052	40.8	45,343
June	127,297	83.9	79,089	51.7	39,648
½ year..	115,844	76.1	77,486	.....	48,717
July	130,772	86.3	85,130	55.8	43,417
August ..	.....	.....	96,096	62.9	53,976
September ..	.....	.....	107,466	70.4	62,737
October ..	.....	.....	131,061	85.9	74,147
November ..	.....	.....	138,877	90.9	84,746
December ..	.....	.....	136,146	89.4	79,872
Year .....	.....	.....	96,760	.....	57,633

Merchant Iron Made, Daily Rate

	1940	1939	1938	1937	1936
January ..	16,475	11,875	11,911	18,039	11,801
February ..	14,773	10,793	9,916	18,496	12,652
March	11,760	10,025	9,547	18,432	12,131
April	13,656	9,529	9,266	16,259	15,565
May	16,521	7,883	7,203	21,821	14,352
June	13,662	8,527	6,020	17,774	15,914
July	16,619	9,404	6,154	21,962	13,013
August .....	.....	11,225	7,408	19,971	13,606
September ..	.....	12,648	12,550	22,473	14,029
October .....	.....	16,409	12,095	21,224	15,282
November ..	.....	16,642	14,793	17,541	16,508
December ..	.....	16,912	10,226	12,280	16,634

Production by Districts and Coke Furnaces in Blast

(All Figures in Net Tons)

FURNACES				Aug. 1, 1940		July 1, 1940	
	July, 1940	June, 1940	July, 1939	Number in Blast	Operating Rate, Net Tons a Day	Number in Blast	Operating Rate, Net Tons a Day
New York:							
Buffalo	268,610	244,133	173,414	11	8,665	11	9,375
Other New York and Mass.	13,189	.....	16,476	2	815	0	.....
Pennsylvania:							
Lehigh Valley	91,771	86,956	54,619	5	2,960	5	2,900
Spiegeleisen	4,731	4,932	5,068	1	155	1	165
Schuylkill Valley ..	44,292	44,465	24,386	3	1,430	3	1,480
Susquehanna and Lebanon Valleys.	43,511	37,732	15,683	2	1,405	2	1,260
Ferromanganese ..	3,045	3,131	.....	1	100	1	105
Pittsburgh District.	878,807	834,087	487,113	37	28,760	37	28,440
Ferro. and Spiegel.	14,360	11,372	18,647	3	465	2	389
Shenango Valley ..	70,043	61,317	12,892	4	2,370	3	2,045
Western Penna. ..	115,230	114,798	55,965	6	3,715	6	3,825*
Ferro. and Spiegel.	14,470	14,676	7,381	1	465	1	490*
Maryland	190,835	195,975	193,864	6	6,155	6	6,535
Wheeling District ..	151,385	158,428	142,956	6	4,885	6	4,840
Ohio:							
Mahoning Valley...	420,913	392,159	293,289	18	13,435	18	14,040
Central and Northern	323,950	293,510	210,888	15	10,600	14	10,340*
Southern	66,154	64,194	48,550	5	2,135	5	2,140
Illinois and Indiana..	836,452	778,937	479,608	30	26,980	30	27,050
Michigan and Minnesota	123,729	125,306	84,060	6	3,990	6	3,855
Colorado, Missouri and Utah	53,489	53,650	46,751	3	1,725	3	1,790
Ferromanganese ..	3,818	3,577	.....	1	120	1	120
The South:							
Virginia .....	.....	.....	.....	0	.....	0	.....
Ferromanganese ..	3,135	3,031	3,108	0	.....	1	100
Kentucky	28,543	26,710	27,836	2	920	2	890
Alabama	283,679	254,985	229,254	16	9,325	15	8,830
Ferro and Spiegel.	4,197	9,086	7,214	2	135	2	305
Tennessee	1,607	1,750	.....	1	50	1	60
Total	4,053,945	3,818,897	2,639,022	187	131,760	182	131,360*

* Revised.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

Flat Rolled Steel: (Cents Per Lb.)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10

Tin and Terne Plate:

(Dollars Per Base Box)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ..	4.30	4.30	4.30	4.30

Bars and Shapes:

(Cents Per Lb.)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10

Wire and Wire Products:

(Cents Per Lb.)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.40

Rails:

(Dollars Per Gross Ton)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel:

(Dollars Per Gross Ton)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00

Wire Rods and Skelp:

(Cents Per Lb.)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 98 to 104 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron:

(Per Gross Ton)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
No. 2 fdy., Philadelphia..	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace....	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti...	23.06	23.06	23.06	21.06
No. 2, Birmingham.....	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa...	24.34	24.34	24.34	22.34
Basic, Valley furnace...	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L S. charcoal, Chicago.	30.34	30.34	30.34	28.34
Ferromanganese†	120.00	120.00	120.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. †For carlots at seaboard.

Scrap:

(Per Gross Ton)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Heavy melt'g steel, P'gh..	\$18.25	\$18.50	\$19.75	\$15.125
Heavy melt'g steel, Phila.	19.00	18.75	19.00	16.25
Heavy melt'g steel, Ch'go	17.25	17.25	17.375	13.875
Carwheels, Chicago	18.25	19.00	19.00	12.75
Carwheels, Philadelphia.	20.75	20.75	21.75	16.25
No. 1 cast, Pittsburgh...	19.75	19.75	20.75	15.25
No. 1 cast, Philadelphia.	21.25	21.25	21.75	16.75
No. 1 cast, Ch'go (net ton)	16.75	16.75	16.75	12.75

Coke, Connellsville:

(Per Net Ton at Oven)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Furnace coke, prompt...	\$4.25	\$4.25	\$4.25	\$3.75
Foundry coke, prompt...	5.25	5.25	5.25	4.75

Non-Ferrous Metals:

(Cents per Lb. to Large Buyers)

	Aug. 6 1940	July 30 1940	July 9 1940	Aug. 8 1939
Copper, electro., Conn.*.	11.50	11.50	11.50	10.50
Copper, Lake, New York	11.50	11.50	11.50	10.50
Tin (Straits), New York	52.25	52.50	51.25	48.80
Zinc, East St. Louis....	6.25	6.25	6.25	4.75
Lead, St. Louis	4.85	4.85	4.85	5.14
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

Composite Prices . .

FINISHED STEEL

Aug. 6, 1940	2.261c. a Lb.....
One week ago.....	2.261c. a Lb.....
One month ago	2.261c. a Lb.....
One year ago	2.236c. a Lb.....

	High	Low
1940	2.261c., Jan. 2	2.211c., Apr. 16
1939	2.286c., Jan. 3	2.236c., May 16
1938	2.512c., May 17	2.211c., Oct. 18
1937	2.512c., Mar. 9	2.249c., Jan. 4
1936	2.249c., Dec. 28	2.016c., Mar. 10
1935	2.062c., Oct. 1	2.056c., Jan. 8
1934	2.118c., Apr. 24	1.945c., Jan. 2
1933	1.953c., Oct. 3	1.792c., May 2
1932	1.915c., Sept. 6	1.870c., Mar. 15
1931	1.981c., Jan. 13	1.883c., Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

PIG IRON

.....	\$22.61 a Gross Ton.....
.....	\$22.61 a Gross Ton.....
.....	\$22.61 a Gross Ton.....
.....	\$20.61 a Gross Ton.....

	High	Low
.....	\$22.61, Sept. 19	\$20.61, Sept. 12
.....	23.25, June 21	19.61, July 6
.....	23.25, Mar. 9	20.25, Feb. 16
.....	19.73, Nov. 24	18.73, Aug. 11
.....	18.84, Nov. 5	17.83, May 14
.....	17.90, May 1	16.90, Jan. 27
.....	16.90, Dec. 5	13.56, Jan. 3
.....	14.81, Jan. 5	13.56, Dec. 6
.....	15.90, Jan. 6	14.79, Dec. 15
.....	18.21, Jan. 7	15.90, Dec. 16
.....	18.71, May 14	18.21, Dec. 17

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL

.....	\$18.17 a Gross Ton.....
.....	\$18.17 a Gross Ton.....
.....	\$18.71 a Gross Ton.....
.....	\$15.42 a Gross Ton.....

	High	Low
.....	\$19.92, June 18	\$16.04, Apr. 9
.....	22.50, Oct. 3	14.08, May 16
.....	15.00, Nov. 22	11.00, June 7
.....	21.92, Mar. 30	12.92, Nov. 10
.....	17.75, Dec. 21	12.67, June 9
.....	13.42, Dec. 10	10.33, Apr. 29
.....	13.00, Mar. 13	9.50, Sept. 25
.....	12.25, Aug. 8	6.75, Jan. 3
.....	8.50, Jan. 12	6.43, July 5
.....	11.33, Jan. 6	8.50, Dec. 29
.....	15.00, Feb. 18	11.25, Dec. 9
.....	17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

STEEL ingot production continues to edge upward, being estimated this week at 91 per cent, half a point over last week, coming closer to the peak rate of recent years, which was 94½ per cent in the last week of November, 1939.

Although national defense requirements are accumulating and will be a much more important factor soon, they do not compare as yet with the tonnages being taken from the United States by Great Britain. The importance of British buying in the current steel situation is indicated by the fact that orders are aggregating 500,000 to 600,000 tons a month. A single item now up for purchase is 40,000 tons of wire rods. Much of the tonnage is in heavy products, but a good many special products are also being sought, for example a sizable quantity of bullet steel, which is an electric furnace product.

In addition to heavy steel takings, the British are anxious to procure in this country as much low phosphorous pig iron as can be had. Idle furnaces might go in blast to make this iron, but they are hampered in their costs by long hauls on low phosphorous iron ore.

It now appears that all possibility of a seasonal dip in steel production has passed. If the British are not defeated, there is every prospect that near-capacity operating rates will prevail in the industry over the remainder of this year at least.

JULY started out the second half with total output of 5,595,070 net tons of ingots despite the holiday week and vacation shutdowns at the beginning of the month. This was at an average rate of 83.4 per cent, which may well be the low point of the last half.

Pig iron production is approaching the almost record-breaking output of last fall. The July total of coke pig iron was 4,053,945 net tons compared with 3,818,897 tons in June and 4,220,536 tons in December last year, the highest level since 1929. The daily rate last month was 130,772 tons, a gain of 2.7 per cent over the June daily average of 127,297 tons. A gain of seven active furnaces during the month brought the number of furnaces in blast on Aug. 1 to 187. The greatest number in blast at one time in recent years was 191, the total reported on Dec. 1, 1939, and on Jan. 1, 1940.

High production in steel and pig iron is not without difficulties. One example is that a large producer, having plenty of coal but insufficient coking facilities, has arranged with another company to process 100,000 tons of coal into coke. Every available ship on the Great Lakes is being used to bring down enough iron ore for the fall and winter, but the season's movement probably will not exceed 60,000,000 tons unless boats are operated very late. The largest movements of re-

• Ingot production rises slightly to 91 per cent . . . Prospect of seasonal dip has apparently passed and outlook is for continued high operations . . . Steel and pig iron output higher in July . . . Scrap composite is unchanged.

cent years were about 62,500,000 tons in 1937 and 65,200,000 tons in 1929.

SCRAP markets show a firmer undertone. There have been advances on some items, but THE IRON AGE steel scrap composite remains unchanged at \$18.17, a slight decline in the Pittsburgh average being offset by a like rise at Philadelphia. Government officials are studying the scrap licensing order issued under the May-Sheppard Act because of the loophole which presumably would permit the exportation of steel grades equal to or better than No. 1 heavy melting steel, the only grade against which the licensing plan at present applies.

STEEL companies are receiving much heavier inquiries for steel required for defense projects. These include semi-finished steel and bars for munitions, plates for shipbuilding, structural steel for hangars and other Government structures, sheet piling and many other products. Large contracts for such requirements as propelling machinery for submarines and anti-aircraft gun carriages have been given out. There will be a demand for steam and electric turbines that will keep builders busy for years, both for the Navy and for power stations.

The War Department is working on designs for 60 munitions plants to be erected with Government funds or by RFC loans and to be scattered over five geographical areas, mostly 200 miles or more from boundary lines. All these plants are to be privately operated.

As the national defense program becomes a more important factor in steel requirements, so also will the automobile industry, steel's largest normal consumer, be coming back into the market. Orders from the automobile industry for 1941 models, though still small, are increasing and will be in full swing within another month or two. The railroads are becoming steady customers and will be an important steel user during the fall.

The Industrial Pace . . .

PRODUCTION AND DISTRIBUTION activities in the durable goods industries continue to show steady expansion and it appears now quite likely that THE IRON AGE index of durable goods activity will break the 90-mark within the next month to six weeks. The index for the week ended Aug. 3 is unchanged from the preceding week at 84.3, despite an exceptionally heavy drop in automobile assemblies.

All the components of the index, with the lone exception of the automobile series, moved moderately higher during the week. The sharpness of the drop in the week's car assemblies which brought output down to 17,373 units from 34,822 in the preceding week, appears to substantiate the impression that the industry is endeavoring to keep the model changeover period as short as possible. In a little over a month, assemblies have declined from 87,550 units to 17,373 units. In 1938 a comparable drop required about eight weeks.

Judging from the experience of recent years, the trough of the changeover period has just about been reached. In 1939, the low point was 12,955 units; in 1938 it was 13,790, and in 1937 it was 28,030.

The week's improvement in the construction component was especially significant for the gain was a direct reflection of defense activities. The past week's awards totaled \$89,602,000, of which \$14,388,000 was privately financed and \$75,214,000 was publicly financed. The total was substantially above the preceding week and was also above the average (\$70,400,000) of the past three months. Contracts awarded for airports, naval bases, ammunition

depots and facilities for fighting forces accounted for a large portion of the week's total.

Carloadings of lumber products in the past week were 36,071 cars, the highest since the week of November 4, 1939. The increase in this activity is also partially a reflection of the increased building activity attributable to the defense program.

Despite a heavy rise in the volume of new orders received by manufacturers in June, according to the National Industrial Conference Board, inventories showed only a very minor rise. From this it may be assumed that the increase in buying in June was not very much in excess of the increase in consumption.

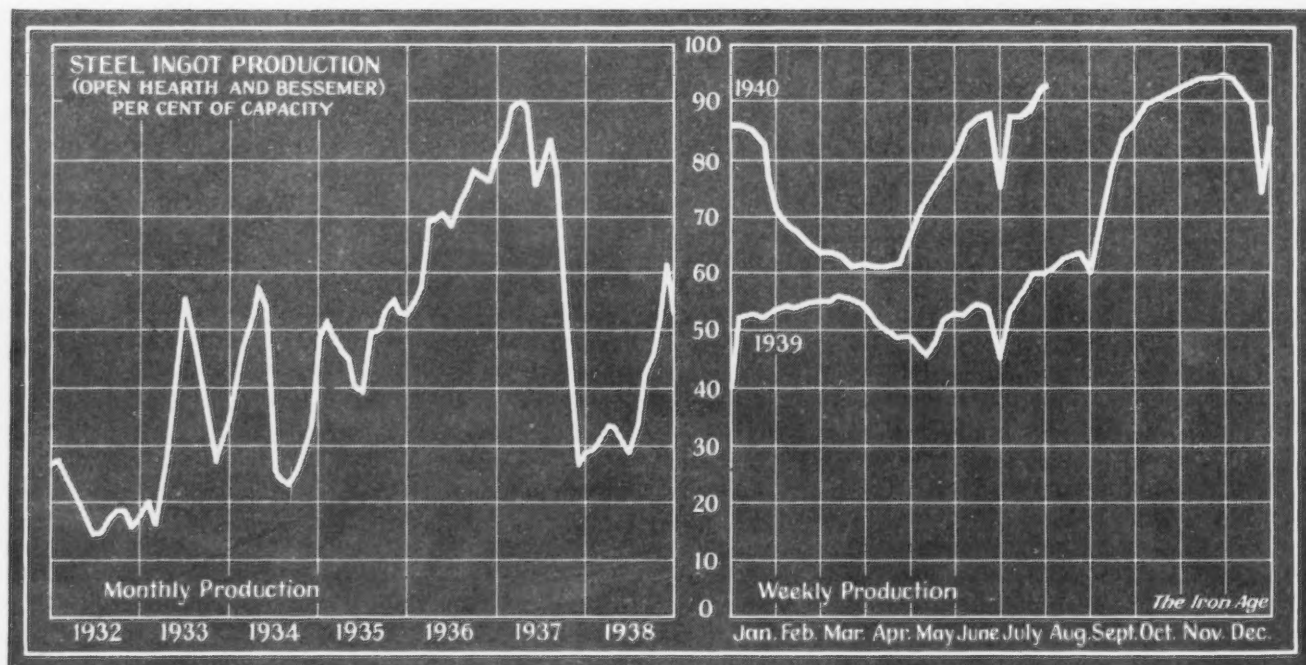
The index of orders for June (see accompanying graph) advanced to 117, the third consecutive rise. In May the index stood at 110, while in June, 1939, it was 96. Comparing the first six months of the current year with the corresponding period of 1939, new orders this year are about 17 per cent higher.

The durable goods industries in June continued to lead the advance, with important increases also recorded in the machinery, electrical equipment and non-ferrous industries.

Index of the value of manufacturers' inventories (see graph) rose one point in June to 132. In June, 1939, the index stood at 110. Comparing the first half of 1940 with the comparable period of 1939, the increase is 17 per cent, identical with the increase in new orders.

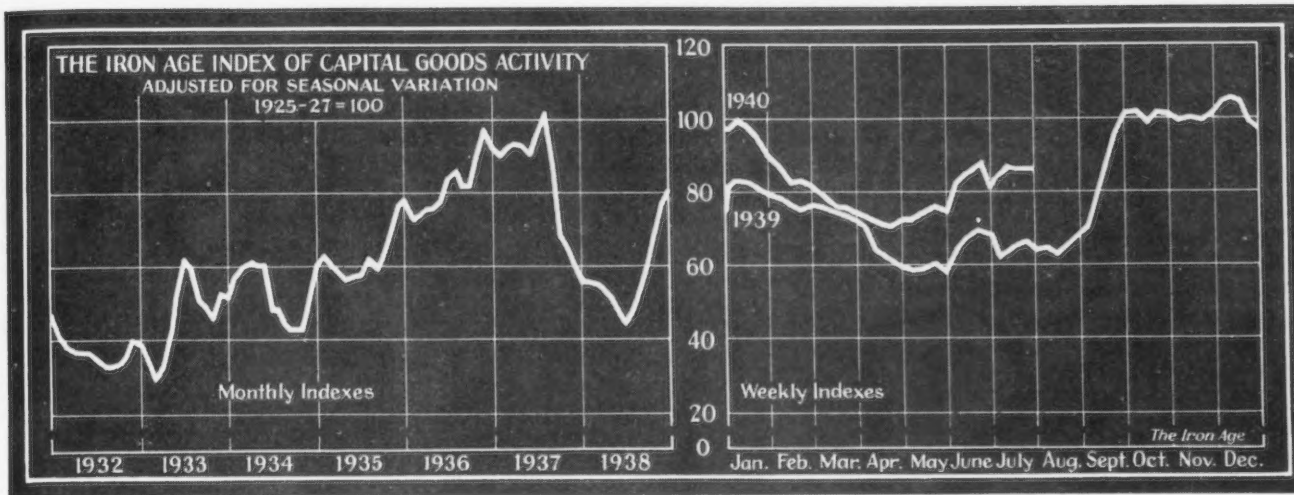
The largest gains in inventory holdings, after allowance for usual seasonal increases, occurred in the clothing, iron and steel, and railroad equipment fields. Stocks declined in the non-ferrous, paper, rubber and automobile equipment industries.

Output at 91%; 3½ Points Below 1939 High



District Ingot Production, Per Cent of Capacity		Pitts-	Chicago	Valleys	Phila-	Cleve-	Buffalo	Wheel-	Detroit	Southern	S. Ohio	West-	St. Louis	East-	Aggre-
Current Week .		87.0	96.5	90.0	93.0	85.0	98.0	104.0	100.0	93.0	89.5	63.0	73.5	75.0	91.0
Previous Week .		86.0	97.0	89.5	92.0	81.0	100.0	104.0	100.0	93.0	93.5	65.0	73.5	75.0	90.5

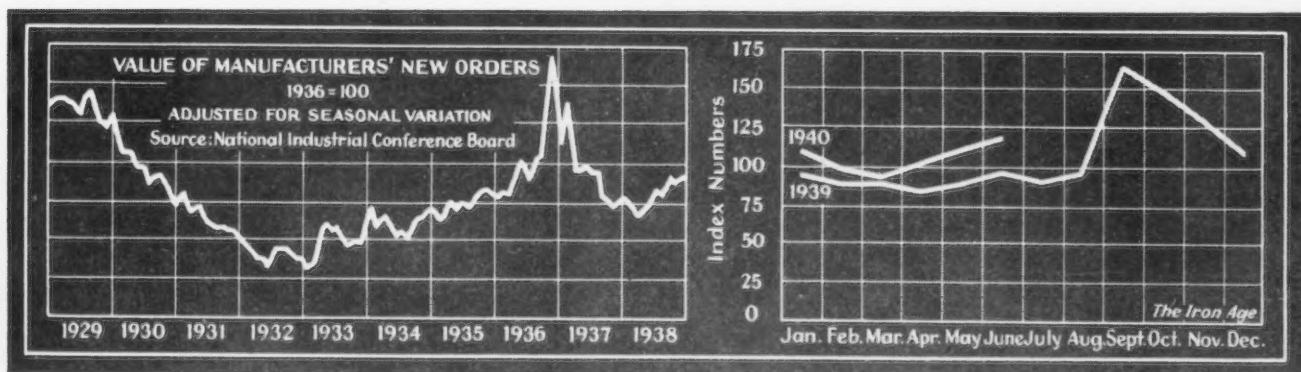
Index Unchanged, Despite Heavy Loss in Auto Series



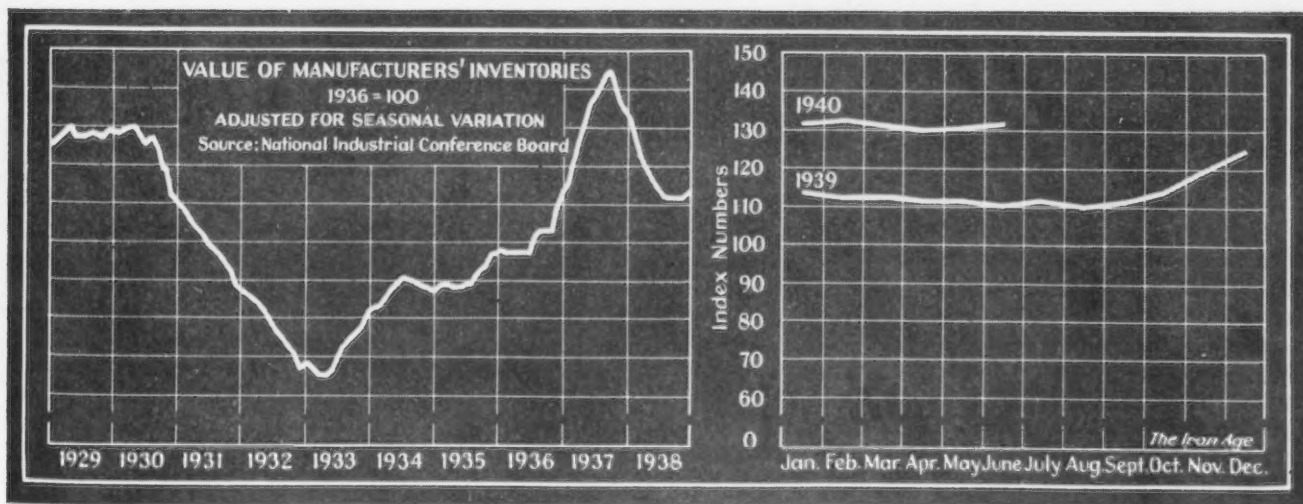
Component	Week Ended	Aug. 3	July 27	July 6	Aug. 5	Aug. 3
Steel ingot production ¹		129.3	125.6	112.2	86.7	135.6
Automobile production ²		26.4	38.4	61.7	33.1	118.5
Construction contracts ³		87.1	83.6	67.2*	65.8	125.1
Forest products carloadings ⁴		67.9	65.7	65.9	61.0	119.7
Pittsburgh output and shipments ⁵		110.8	108.4	107.0	77.2	129.8
COMBINED INDEX		84.3	84.3	82.8*	64.8	125.7

Sources: ¹THE IRON AGE; ²Wards Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended July 27. Other indexes cover week of Aug. 3. *Revised.

New Orders in June 6% Above May



Manufacturers' Inventories Rise Slightly in June



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... Automotive orders begin as other tonnage holds steady

Export and domestic demand for steel products at PITTSBURGH continues strong, with the latter showing moderate improvement in the past few days. A significant pickup has been noted in automotive sheets which, although not large tonnagewise, may portend large scale automotive buying in the near future. Other products in great demand include plates, shapes, wire products, and bars. In many instances incoming business continues somewhat ahead of shipments and production with backlogs showing a corresponding increase.

New business during July at CHICAGO mills ranged from about even with the previous month to around 10 per cent less. The decrease in most cases was principally caused by the June 30 deadline on the receipt of specifications for low priced sheets. Though some orders were taken over into July the bulk of the sheet business came in the 30 days of June and from the middle of July on to the present time, sheet orders in this district have not been an important factor in the total. New business so far in August is running along at about the same rate as the last week in July but later this month sellers expect more tonnage to develop and August probably will be somewhat in excess of July. Only a small portion of the steel necessary for the 1941 automobiles has been ordered to date, and it is this tonnage together with the ever increasing activity on the part of railroads to improve rolling stock and the national defense program, that is expected to give a boost to August and to maintain operations over the next several months at a high rate.

Because of the extremely high operating rates at all CHICAGO mills, backlogs have not had much of a chance to develop. Except in a few products, deliveries are still virtually prompt. Mills are anx-

ious to obtain every pound of steel possible. One CHICAGO mill reports a greater volume of business in piling than at any time in the past six months.

CLEVELAND and YOUNGSTOWN steel producers are receiving much heavier inquiries arising from the United States armament program. These involve semi-finished steel and bars for munitions work, plates for government shipbuilding on the Great Lakes, and a wide range of other types of finished steel. Demand for electric furnace alloy steel, which has been far ahead of production capacity for months, remains steady. Practically the only products which are not enjoying brisk demand at CLEVELAND are skelp, rods and tin plate.

The BUFFALO market has shown a tendency to slow down slightly, mill officials report this week. Mills still are operating at near-capacity, however, and it is felt it will not be long before the flow of orders again will be greatly in excess of production schedules.

Award of Naval vessels for construction on the Pacific Coast further complicates the delivery situation there. Wide plates continue to be the longest term delivery classification. Large tonnages still remain to be awarded under the national defense program, particularly in reinforcing bars.

Railroad buying and heavier shipyard releases bolstered plate demand further this week in the PHILADELPHIA district.

Steel Operations

... Further rise in rate for industry to 91 per cent

There were gains in four steel making districts this week. PITTSBURGH is up one point, YOUNGSTOWN half a point, EASTERN PENNSYLVANIA one point and the CLEVELAND-LORAIN district four points. There were declines also in four districts, CHICAGO losing half a point, BUFFALO two points, SOUTH-EARN OHIO RIVER district four points

and the WESTERN district two points. Other districts are unchanged. The net result is a gain of half a point in the national operating rate to 91 per cent.

With the blowing in of a Hanna blast furnace at BUFFALO, the National Steel Corp. is now operating its pig iron and steel producing facilities at 100 per cent.

Pig Iron

... Shortage may be felt by end of the year

The heavy demand for steel-making grades of iron, coupled with the large British program in prospect and the fact that foundry operations have not yet begun to reflect defense needs, may result in a pronounced shortage of pig iron by the end of this year.

If present plans of the British are carried through, shipments to that country, chiefly low phosphorous grades, may reach 50,000 tons a month. Some new British business has been placed recently, but a large part is yet to be awarded. Possibility of relighting an EASTERN PENNSYLVANIA blast furnace which has been idle since 1930, to supply part of Britain's needs, is under discussion.

PITTSBURGH pig iron producers have considerable tonnage on the books, shipments are somewhat ahead of a month ago, and steel making iron production is at capacity. Some companies are stepping up production by the use of blast furnace scrap, others are using a considerable tonnage of low volatile coking coal, thus giving them a coke which will increase their average yield of pig iron. One large integrated steel company with plants in the Valleys recently negotiated a deal whereby another company in the same area will convert 100,000 tons of coal into by-product coke which will be shipped to the first company who furnished the coal. The steel company furnishing the coke is able to utilize its by-product coke plants for this conversion project because of one of its

blast furnaces being down for repairs.

With the blowing in of an additional blast furnace at Buffalo, the Hanna Furnace Corp., subsidiary of National Steel Corp., started operations on a capacity basis on Aug. 3. Since its other units already have been running at capacity for some time, the addition of the Hanna furnace brings operations of National's entire iron and steel producing facilities to the 100 per cent level.

Except for foundries which serve the machine tool industry, few have yet felt the effects of the national defense program, and it may be several months before the full impact of government purchases hits the foundry industry.

Iron Ore

... Season's movement may be 60,000,000 tons if boats run late

Only with full carrying capacity operating until very late in the season can the 60,000,000-ton mark be reached this season in iron ore shipments from upper Great Lakes ports. Upon Aug. 1, half way through the navigation season, shipments totaled 27,702,178 gross tons, including 122,709 tons of Canadian ore. This is 7,000,000 tons lower than the movement in 1937 up to Aug. 1, and 5,000,000 tons below the comparable part of 1929.

At the end of the 1937 season, about 62,500,000 tons had been brought down, and in 1929 the movement totaled about 65,200,000 tons.

This year navigation did not open as quickly as in 1937; American Great Lakes fleet has been reduced in size compared to 1937.

Shipments in July totaled 10,433,488 gross tons, including 50,057 tons of Canadian ore, according to the latest report of the Lake Superior Iron Ore Association. The July movement was very good considering all circumstances. It was around 4,000,000 tons ahead of the July, 1939 movement, and about 300,000 tons below shipments of July, 1937.

Output of some Northern iron mines is completely sold out now. The movement of Lake Superior iron ore to the Eastern seaboard is reported unusually heavy due to wartime conditions.

Structural Steel

... Awards slightly over 20,000 tons, new projects about 24,000 tons

A quiet week in awards and inquiries for fabricated structural steel does not obscure the fact that a good deal of tonnage is still to come. Awards were a little above 20,000 tons, while new projects totaled just under 24,000 tons. The largest national defense work award is 3620 tons for airplane hangars at Norfolk, Va.

Structural specifications have expanded considerably in the past week and are beginning to reflect the step-up in fabricated structural awards which started several weeks ago. Increased domestic business plus a steady flow of export specifications has resulted in most structural mills operating at close to capacity.

Plates

... Deliveries on wide material become more extended

Deliveries on wide plates at PITTSBURGH remain quite extended and new business within the past week has compared favorably with recent weekly tonnages.

Orders at CHICAGO for steel plates, particularly wide plates, are being received in good volume. One CHICAGO mill has obtained orders for wide shipbuilding plates from Great Britain and some of these have already been shipped. The railroad car builders, as well as the railroad shops where car repairs are underway, are also important plate buyers.

At CLEVELAND orders in the first few days of this month were showing a decided gain over the same part of July. One CLEVELAND mill is unable to promise delivery short of four to five weeks. Around 4000 tons of plates and shapes will be required by the American Shipbuilding Co., which recently received a \$6,500,000 contract for building anti-submarine net tenders. Six of these vessels will be built at CLEVELAND, the others at Lorain and Chicago.

New bookings in the NEW YORK area in the past week were somewhat spotty. July sales were substantially above June and a continu-

ation of that trend is looked for in August. Fabricators and railroad equipment makers were responsible for a large share of the July gain. Export market, outside of Great Britain and Canada, continues quiet. Some small lots were booked in the past week from Dutch East Indies, South Africa and South America. Several small lots of material originally scheduled for Europe are being resold, some at prices slightly below the published price. Quantity involved is so small, however, it is not expected to have any influence on general domestic or export markets.

Columbia Steel Co., San Francisco, was awarded 3765 tons for the University of California's new super atom smashing cyclotron. Storage tanks for Navy construction at Sitka and Kodiak Islands, Alaska, call for approximately 1450 tons.

Semi-Finished Steel

... Shipments are heavy ... Part of Japanese inquiry placed

Total semi-finished specifications are changed but little from a week ago; shipments are exceptionally heavy, and export demand continues steady at recent levels. Some major steel companies are booked for some time ahead on available semi-finished capacity. Part of the recent Japanese inquiry involving more than 100,000 tons of semi-finished material has been placed.

The semi-finished market at CLEVELAND is headlined by inquiry for rerolling billets from Great Britain. Sheet bar orders have remained on an even keel for some time but forging steel requirements are edging higher.

Tubular Goods

... Large line pipe tonnages divided among several producers

Standard pipe demand at PITTSBURGH remains at a relatively high level but oil country goods specifications have shown little life recently. The impending defense program has caused some oil and gas companies to expedite the placing of line pipe, with the result that substantial tonnages of this product have been booked recently. Aside from a mass of tonnage in-

volving small miscellaneous lines, approximately 39,000 tons of line pipe involving two lines have been placed within the last few weeks. The Natural Gas Pipe Line Co. of America has ordered 25,000 tons of 20-in. line pipe from the A. O. Smith Co., Milwaukee. The line will run from Geneseo, Ill., to Milwaukee, a distance of approximately 160 miles. The Socony-Vacuum Co., New York, is to build a pipe line from Buffalo to Syracuse, a

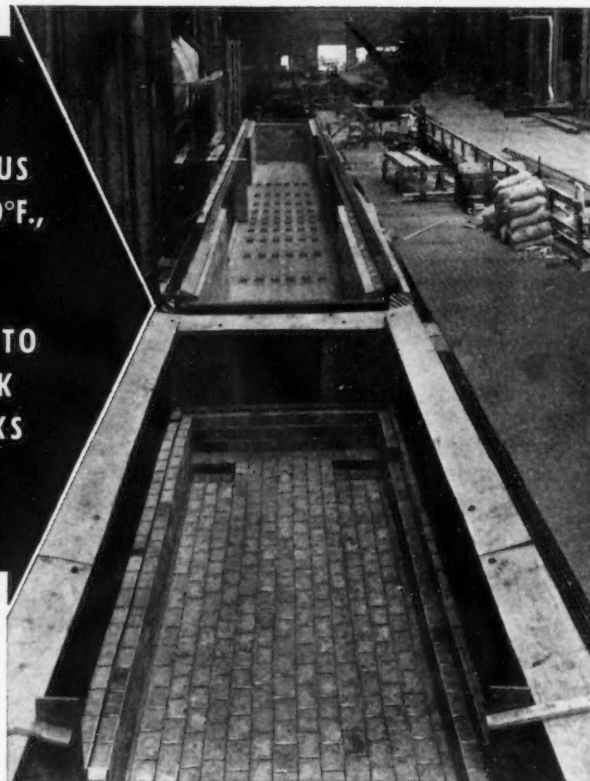
distance of approximately 170 miles. National Tube Co. and Jones & Laughlin will furnish the 8-in. gasoline pipe and the order involves approximately 13,500 tons. The Texas-New Mexico Pipe Line Co. recently purchased about 7000 tons of line pipe including 8, 10 and 14 in., for a 103-mile oil line to run from Hockley County, Tex., to Midland. National Tube Co., A. O. Smith Corp. and Youngstown Sheet & Tube Co. shared in the order.

Delivery problems are increasing on some sizes of standard pipe at CLEVELAND. Heavy government purchases have contributed to the situation. Airport construction is a prominent factor, bomb production is taking much seamless tubing, and the South American market is very active. New business in line pipe has been light because one producer has been practically out of the work during the past month.

American Rolling Mill Co. has been awarded 120,000 ft. of electric welded pipe for a power plant at Venice, Ill.

**FOR CONTINUOUS
PICKLING AT 210°F.,
WIERTON STEEL
COMPANY USES
ASPLIT CEMENT TO
BOND THE BRICK
LINING OF TANKS**

Two of the four continuous pickling tanks in the plant of the Wierton Steel Company. All are brick lined and bonded with Asplit Cement. Surface joints only $\frac{1}{8}$ " to $\frac{1}{4}$ " thick present a surface that will never be attacked by hot acid and steam.



● Production requirements at Wierton Steel Company made it necessary to raise the temperature to 210°F. in the brick-lined pickling tanks. Some acid-proof cements would not stand such heat. Asplit Cement* was used because it withstands temperatures up to 350°F., in addition to resisting acid and abrasion even better than the bricks themselves.

Asplit Cement forms tough, hard surface, liquid-tight joints. It is as easy to work as ordinary mortar, yet a very thin joint or coating forms an effective binding and gives greater economy in construction. Its setting time is readily controlled by temperature.

Many plants use our Penchlor Acid-Proof Cement*, which is inert to all acids except hydrofluoric. Pennsylvania Salt Manufacturing Co., Widener Bldg., Phila., Pa.—New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte.

*Fully protected by existing patents.



WRITE FOR FREE TEST KIT. You can prove for yourself the outstanding properties of these acid-proof cements, and make a convincing comparison with the product you are now using, by means of the free Test Kit supplied on request. Write us today on your business letterhead.

**PENNSYLVANIA SALT
MANUFACTURING COMPANY**
Chemicals

Reinforcing Bars

... Total awards over 7900 tons, new projects 15,200 tons

Awards of reinforcing steel during the past week, as reported to THE IRON AGE, totaled over 7900 tons while new projects which came into the market for bids amounted to 15,200 tons. The largest award was 1750 tons for reinforced concrete pipe in California. Inquiries include 2900 tons for a housing project in Brooklyn, 2000 tons for a Veterans Hospital at Perry Point, Md., and 2000 tons for naval shore facilities at San Diego, Cal.

Sheets and Strip

... Business being booked at current market prices

Sheet order books at PITTSBURGH continue to reflect a wide miscellaneous demand with individual orders still relatively small in tonnage. Automotive requirements are expected to be stepped up sharply before the end of this month. High-speed sheet mills throughout the country which were built to accommodate plate rollings are getting an exceptionally good work out on the latter product. In some cases shipments on low priced sheet tonnage will probably not be cleaned up much before the end of this quarter, but the sheet price structure on new business is reported to be firm.

New sheet orders at the full market prices are being obtained daily by CHICAGO producers. In some instances this tonnage has attained a volume which was entirely unexpected in view of the heavy buying at the \$4 a ton concession and indicates to sellers

that, in these cases at least, heavy stocking at the low price was not a factor. There was, of course, considerable advance buying of sheets at the concession but it is now apparent that not all buyers took advantage of this price because of the many uncertainties that did and do exist. Some sheet producers feel that the low priced sheets will be entirely off their books by the end of this month, whereas others are mentioning the end of September as the date by which all bargain tonnage will have been rolled and shipped. To date, but little tonnage for 1941 automobiles has found its way into the Chicago district. Sheet mills are looking to the railroads as an important source of business over the next few months.

Ordering of sheet steel in the SOUTHERN OHIO district is averaging about 75 per cent of mill capacity.

A few lots of sheets and strip originally scheduled for shipment to Europe are being offered by NEW YORK export houses for resale.

Merchant Bars

... Orders will soon come from automobile industry

Total bar business at PITTSBURGH has expanded slightly in the past week. Incoming business involves export buying, domestic defense requirements, and material for general trade channels. Further impetus will be given soon when automobile companies come into the market for 1941 model requirements. West Virginia Rail Co., Huntington, West Va., recently booked 10,000 tons of light rails from the British Purchasing Commission.

Demand for bars is being well maintained in the CHICAGO district, though there has been a slight decrease in total bookings in the past week or two. Though the vanguard of orders for 1941 cars has not yet reached that district, it is expected at almost any time and a substantial tonnage of bars can well be earmarked at this time for future use by the automotive and automotive parts industries. Bar deliveries may be obtained in three to four weeks up to six weeks, depending on the size.

A feature of the bar market at CLEVELAND is an unusually large inquiry for 2½-in. hot rolled rounds which will be split into monthly tonnages and presumably is for munitions work. This is in addition to a large inquiry for 6-in. rounds for shafts. CLEVELAND and YOUNGSTOWN bar producers are quoting six to eight weeks on various small sizes and four to six weeks on 10-in. mills. One producer is unable to

furnish any bars short of three weeks and prefers four weeks' time. It is estimated orders for July were 15 to 20 per cent ahead of those of June.

Wire Products

... Shipments to automotive manufacturers are increasing

With large order backlogs in high quality special wire and with

CONSULT

THE "PITTSBURGH" MAN

RE: FINISHING BRUSHES



WOULD you like to reduce the cost of finishing light gauge steel or tin plate? Then—talk with our field representative. The "Pittsburgh" man is a thoroughly trained technician who understands production problems. He will gladly work with you in developing "Pittsburgh" Spiral Wound Brushes to meet your specific finishing requirements.

"Pittsburgh" Spiral Wound Brushes may be had in various fills—horsehair, nickel silver wire and tampico. Write or phone for further information.

**PITTSBURGH
PLATE GLASS COMPANY**

BRUSH DIVISION • BALTIMORE, MD.

shipments of manufacturers' wire increasing to the automotive industry, August holds every promise of being a very good production month at CLEVELAND. Late July was marked by heavy sales received too late to assist July shipments.

Total wire sales at PITTSBURGH have improved in volume recently with heavier demand for wire rods and manufacturers' wire.

Warehouse Business

... July orders up at Pittsburgh, down at Chicago

Reflecting an extension in mill deliveries, PITTSBURGH warehouse business in July ran from 15 to 20 per cent greater in volume than in June. Demand was exceptionally well diversified both as to consuming interests as well as

products, with structural shapes, plates, and bars leading the lists. Most inquiries are for prompt delivery and indicate the orders are for immediate consumption. Warehouse interests look for a continuation of the improvement, if for no other reason than the unabated accumulation of backlogs at steel mills.

A seasonal decline in the last two weeks of July was experienced by Chicago steel warehouses. July as a whole was less than June only by that amount, which figured up to an insignificant percentage.

Railroad Buying

... Additional car programs are announced by two roads

Two railroads have announced programs for new cars. The Chicago, Burlington & Quincy will build 1000 box cars in its own shops. The Chicago, Rock Island & Pacific is seeking court permission to buy 1000 freight cars and to build 200 gondolas in its own shops.


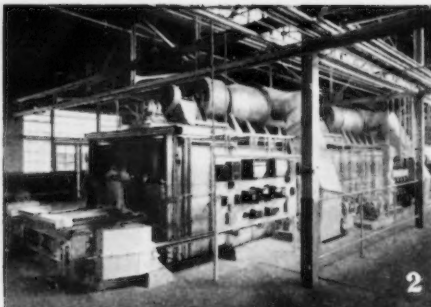

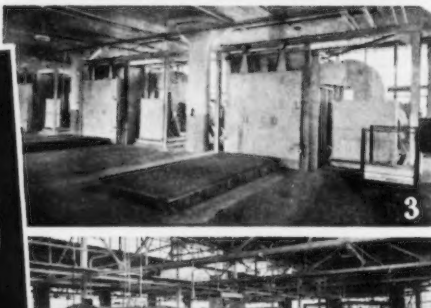
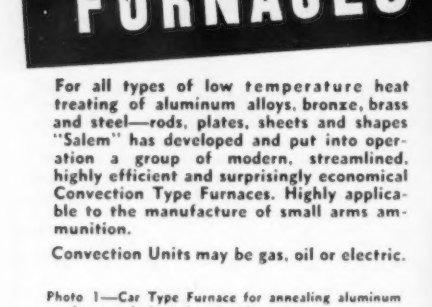
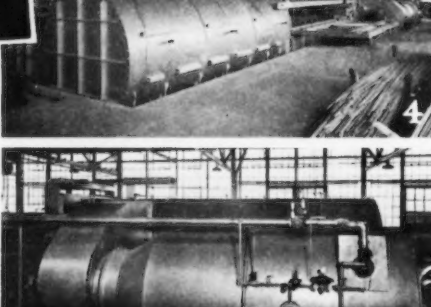
Norfolk & Western has ordered 500 box cars from Ralston Steel Car Co. Chicago & North Western has received authority to acquire 60 covered hopper cars from General American Transportation Corp. under a lease-purchase plan.

Lima Locomotive Works has been awarded two large steam freight locomotives by Akron, Canton & Youngstown. Erie has purchased about 5500 tons of car repair parts from Carnegie-Illinois Steel Corp. and additional steel for the same program will be required by Greenville Steel Car Co.

Pere Marquette has purchased 1850 tons of 112-lb. rails from Carnegie-Illinois Steel Corp. and Western Maryland has divided a 2000-ton rail order between Bethlehem Steel Co. and Carnegie-Illinois Steel Corp.

Important inquiries yet to be placed total 5115 freight cars and include 1665 for Atlantic Coast Line, 2450 for Southern Pacific, and 1000 for Union Pacific, all of which have been mentioned previously in THE IRON AGE.

If the carriers are to meet the recommendations of the National

"SALEM"

Announces

a NEW LINE of

CONVECTION

FURNACES

For all types of low temperature heat treating of aluminum alloys, bronze, brass and steel—rods, plates, sheets and shapes "Salem" has developed and put into operation a group of modern, streamlined, highly efficient and surprisingly economical Convection Type Furnaces. Highly applicable to the manufacture of small arms ammunition.

Convection Units may be gas, oil or electric.

Photo 1—Car Type Furnace for annealing aluminum sheets and plates for aircraft parts.

Photo 2—Continuous Chain Conveyor Furnace for heating aluminum billets for rolling.

Photo 3—Car Type Furnaces. Convection unit located along side furnaces.

Photo 4—Tubular Hardening Furnace including quench, fully automatic.

Photo 5—Shows the new type convection unit.

THE WITTER PROCESS

for FORGING SHELLS

20% Savings in materials

50% Increase in production

"SALEM'S" practical and progressive engineers will gladly discuss your problems with you.



SALEM, OHIO - CHICAGO - DETROIT - PITTSBURGH - PHILADELPHIA - LONDON - WELLAND, ONT.

SALEM ENGINEERING COMPANY

Defense Advisory Commission and reduce the number of freight cars needing repairs to 6 per cent, considerable additional repairing or buying will be necessary. The commission, in making the suggestion, set Oct. 1 as a tentative deadline in meeting the 6 per cent level.

The number of bad cars on order in 1939 averaged 12.9 per cent. On June 30, this year, they had been reduced to 9.5 per cent. On the same date, the number of freight cars available was 1,695,388, indicating that the number of new or repaired cars required to meet the 6 per cent maximum is about 72,000 cars. Of the 1,695,388 cars available on June 30, 400,317, or about 25 per cent, were over 25 years old.

Freight car purchases in July amounted to 5846 cars, highest monthly total since October, 1939, according to *Railway Age*. June purchases were 4235 cars. Cars ordered in the first seven months of the present year aggregate 16,431 units, compared with 9077 cars in the comparable period of 1939 and 56,915 cars for all of 1939. Although July purchases were highest in eight months, they were only one-quarter of the peak of 1939—24,231 cars in September.

Locomotive purchases in July amounted to 51 units, highest monthly total since September, 1939, when 52 units were bought. Cumulative total for the year to date is 236 units, as against 156 in the corresponding period of 1939.

Shipbuilding

... Maritime Commission to take bids Aug. 20 on three boats

The Maritime Commission has invited bids Aug. 20 for the construction of three modified C-2 type single screw cargo vessels to be built for the Ocean Dominion Steamship Corp. To require a total of 10,800 tons of steel, the vessels will be especially designed for the transportation of bauxite for the Aluminum Co. of America and will be operated from the North Atlantic and Gulf ports to the Caribbean.

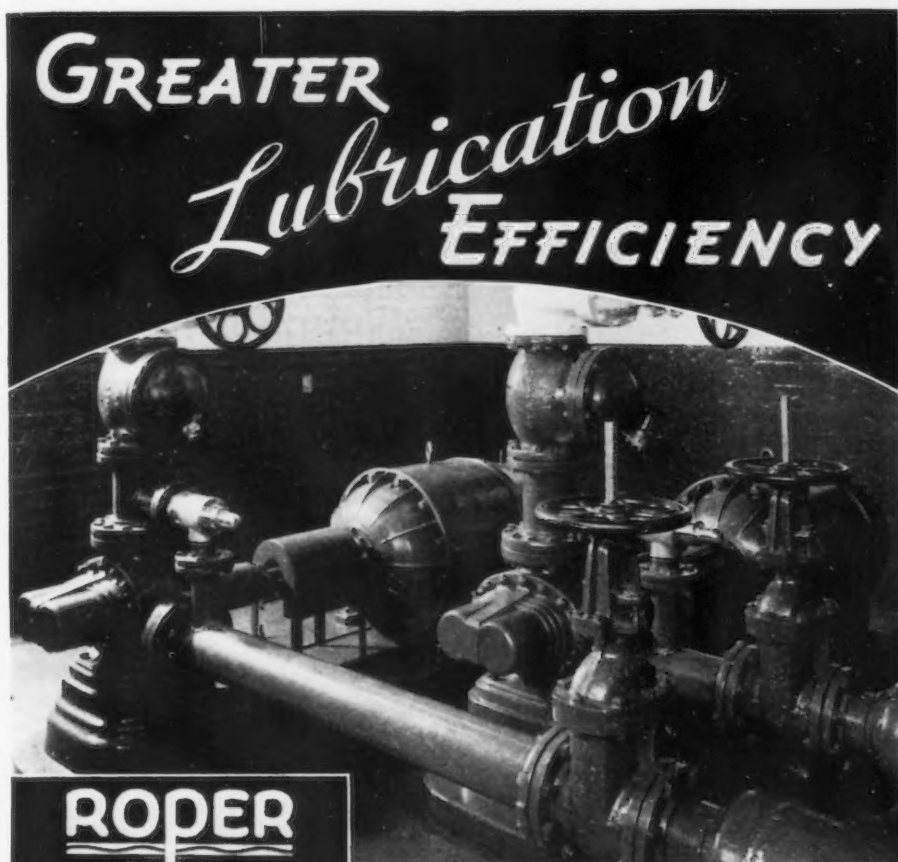
Tin Plate

... Operations lower as export and domestic buying declines

With foreign purchases dwindling and with domestic buying having shown further leveling off, the immediate outlook for fresh tin plate orders continues uncertain. Part of the domestic con-

dition is undoubtedly due to seasonal factors. Although specifications have fallen off, shipments remain comparatively heavy but tin plate operations have declined a point this week to 70 per cent.

The major independent steel company in the PITTSBURGH district is dismantling 12 of its hot tin plate mills in line with its long term program.



● CAPACITIES—1, 3, 5, 10, 15, 20, 35, 50, 75, 100, 150, 200, 300, 500, 750 and 1000 gals. per minute.

● PRESSURES—up to 1000 lbs. per sq. inch.

● SPEEDS—direct motor speeds up to 1800 R.P.M.

● BEARINGS—sleeve and roller.

● MOUNTINGS AND DRIVES—21 different models to meet your requirements.

GIANT gear drives; stand, rack and manipulator bearings; reversing tables; table rollers; moving parts of screw down mechanisms—all demand the safest form of constant lubrication under pressure. Most of them depend upon ROPER ROTARY PUMPS to provide the maximum assurance of properly maintained lubrication.

ROPER PUMPS are simple in design (only two moving parts), easy to install, easy to service. They produce the ultimate in mechanical and volumetric efficiency and are known everywhere for their dependability, extremely low operating and maintenance costs.

Write for our new catalog 941.

GEO. D. ROPER CORP., ROCKFORD, ILLINOIS.

Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Tremendous Inquiries Out

New York

●●● Inquiries continue to come out in huge volume in this district. A new and larger program is under way at Wright Aeronautical Corp., calling for hundreds of machines. Pratt & Whitney Aircraft is inquiring for machinery for a new machine shop and several of the lower powered engine builders are actively in the market, following receipt of Government orders. Both the Army and Navy also have large lists out for arsenals and Navy yards. Many other industrial firms in this vicinity are lining up machine tools for ordnance production, but show some signs of hesitation in placing orders until details of Government contracts are worked out.

Some attempt is being made to sell machine tools held by the French at New York docks, but so far red tape has prevented the resale of such machinery. The Japanese have been quite cooperative in releasing to local manufacturers and the Navy machinery for which they have not been able to obtain export licenses. As a result, certain tools for which there is no demand here in connection with the defense program have been allowed to go through. The Amtorg Trading Corp., Russian agent, on the other hand, has held up the release of such machinery at the docks, preferring apparently to let such machinery gather rust rather than serve in the defense program of the United States.

Licensing Going Smoother

Cincinnati

●●● With continued heavy milling machine and grinder demand in this area, market averages currently are unchanged from previous levels. Other machine tool demand does not show the same high degree of interest, but this does not mean that other machines are without better than normal ordering. A number of inquiries are reported in the market for prospective armament and associated purposes, but details have not been

disclosed except that Buda Co., Harvey, Ill., is in the market for a substantial amount of equipment. Export licensing appears to be going smoother, but the trade generally is still uncertain as to just how far, or to what extent the licensing may become an embargo.

Production continues at present plant capacity, although a few manufacturers are still interested in further expansion. Until the question of amortization of expenditures and similar problems are worked out satisfactorily with the tax officials at Washington, local executives indicate that such expansion will not go forward.

Delivery Dates Extended

Chicago

●●● Further extension of deliveries has become necessary in many quarters due to the high rate of current demand. Business in the month just past was substantially improved over that of June, and the future outlook is for even further betterment. Dealers report no difficulty in making sales but run into difficulties in attempting to get delivery. Stocks of manufacturers are believed quite generally depleted, even in the more common tools. Meantime, dealers report maintenance of a heavy volume of inquiries. Government

work is becoming more and more prominent.

British Buy Used Tools

Cleveland

●●● Sales in this vicinity continue in good volume. The Detroit and Saginaw territories have been particularly active during the past two weeks. Other orders have come from Ellwood City, Pa., and Youngstown and Canton. Facilities are being readied at Massillon for applying armor plate to trucks. The Toledo Chevrolet plant has bought some new equipment recently. The locomotive works at Lima has received an order for 20 steam engines, but whether new machine tool equipment may be required is unknown at this writing. The British continue to buy used machine tools generously.

One aircraft parts making company here, which spent around \$2,500,000 in expansion last year, has dropped from a seven-day production basis to five days per week, because French orders have not been taken up by any other Government and because the U. S. program is not going forward as fast as expected.

Machinery Institute Asks For Carryover Tax Period

Chicago

If the durable goods industries of the country are to be maintained on a basis where they can give their full measure of productive activity to the new national defense program, corrections of an extreme discrimination will have to be made in the federal income tax law expected to tax excess profits, the Machinery and Allied Products Institute declares in a special message to Congress. The institute, which is headed by William J. Kelly, Chicago steel products executive, urges Congress to change income tax procedure so that corporations manufacturing durable goods will be allowed a carryover period of at least six years to equalize profits and losses.

Metal Working Machinery Imports Into Canada, June, 1940

Classification	United States	United Kingdom	Total All Countries
Drilling and boring machines	\$84,893	\$22,890	\$107,783
Grinding machines	82,544	1,995	84,539
Lathes	162,633	55,821	218,454
Milling machines	84,793	10,187	94,980
Planers	15,378	....	15,378
Presses	94,946	....	94,946
Rolling mill machines	65,495	12,916	78,411
Shapers and slotters	30,648	1,873	32,521
Not otherwise listed	538,593	3,298	551,830
Grand Totals	\$1,159,923	\$108,980	\$1,278,842

Source: Dominion Bureau of Statistics.

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York, Aug. 6—An undercurrent of fairly heavy demand for prompt metal is in evidence in all non-ferrous markets, but because of price uncertainties in some metals and apprehension over possible turn of events in Europe and the Far East, it has not been possible to bring this demand out into the open. Copper sales in the past week, mostly involving July or early August delivery, were a little below the average of two weeks ago, but were above the rate of a month ago. Sales of the red metal in the first three days of the present month were about 6700 tons, as compared with 4000 tons in the comparable period of July. Quotations moved up and down during the past week, with no indications of the development of a trend. Early in the week smelters were asking 11¼c. for electrolytic metal, delivered Connecticut Valley, and some small business was done at ⅛c. above this. Today, however, sales were made at 11c. Mine producers continue to hold to 11.50c. per lb. Another disturbing factor was the reduction of ⅛c. in No. 1 scrap copper to 9.50c. per lb., equivalent to about 11c. for the refined metal.

Japan, which is the only export market of any importance still open, increased its commitments during the week by about 15,000 tons at prices ranging from 9.90c. to 9.95c. per lb., f.a.s.

Lead

While consumers are still in no hurry to cover September requirements, the call for August lead is being maintained at a fairly active pace. Demand in the first two days of the current week moderated somewhat, but sellers were still able to dispose of quotas. The heavy August demand has resulted in the acquisition by consumers of close to 65 per cent of that month's needs. Chief strengthening factor in the market at present is the strong flow of lead into consumption. July deliveries are estimated to be between 55,000 and 57,000 tons. Quotations are unchanged at 5c. a lb., New York.

Zinc

Prime Western sales in the past week slumped to 6615 tons from 11,314 in the preceding week and 8861 tons three weeks ago. The decline is considered a reflection of the general uneasiness in the markets and a resumption of buying in better volume is looked for as soon as the high rate of spelter consumption is undoubtedly depleting supplies at a much higher rate than they are being bought.

Tin

Buying of tin in the past week was not as strong as in the preceding two weeks, but there is still a live interest in nearby metal. The Far Eastern situation is being followed very closely by consumers and any further deterioration of conditions there would unques-

tionably bring out another heavy buying movement.

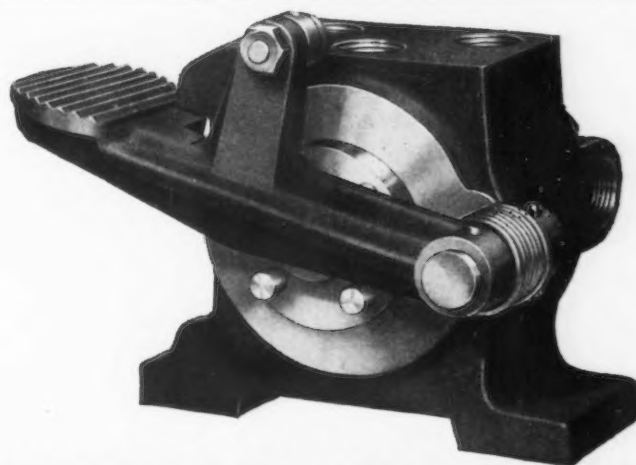
Aluminum

Quotations were lowered 1c. a lb. by Aluminum Co. of America on Aug. 1, bringing virgin metal down to 18c. per lb. in carlots. On March 25 a similar reduction had been made.

Average prices of the major non-ferrous metals in July, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley...	11.50c.*
Lake copper, Eastern delivery.....	11.50c.
Straits tin, spot, New York.....	51.61c.
Zinc, East St. Louis.....	6.25c.
Zinc, New York.....	6.64c.
Lead, St. Louis.....	4.85c.
Lead, New York.....	5.00c.

*Mine producers only.



HEAVY DUTY ROTARY VALVE LEAVES BOTH HANDS FREE

Simple, positive control of air operated equipment is easily obtained with this heavy duty rotary valve. One pressure operates the cylinder, second pressure reverses the cylinder. Disc-type design without packing prevents leak-

age and packing maintenance troubles. Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, heavy duty rotary, electric and special models. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue • Chicago, Illinois

ENGINEERS • DESIGNERS • MANUFACTURERS • DOUBLE-ACTING PNEUMATIC AND HYDRAULIC CYLINDERS, ALL SIZES

HANNIFIN "Packless" VALVES

AIR CONTROL

Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

• • • A decline of 25c. in the Pittsburgh average was counteracted by an increase of 25c. in the Philadelphia average, leaving THE IRON AGE composite price unchanged for the third consecutive week at \$18.17. Mill interest in new commitments is still limited and price changes reported in the major markets were largely the result of clarification of the range of quotations. The Pittsburgh decline in No. 1 steel was due to a reduction in the \$1 spread of a week ago to 50c. The increase at Philadelphia was the result of dropping the lower end of the \$18.50 to \$19 range and quoting a flat \$19. Both changes were based on sales.

A stronger undertone is reported in Buffalo, New York, Philadelphia, Chicago and Cincinnati. Export prices at Boston are slightly higher, and at Philadelphia and New York are unchanged.

Aside from concentrating interest on the No. 2 steel, the licensing move has not yet had any noticeable influence on prices. Three weeks ago first indications that the bottom of the downward movement had been reached appeared here and two weeks ago price declines practically disappeared. The composite price for that week remained unchanged, the first time in five weeks that a loss was not shown.

Application for shipment of No. 1 steel to Japan has been made, but no action has yet been taken on these requests. Meanwhile, shipment of No. 2 steel, bundles and related grades to Japan continues at an active pace.

Pittsburgh

No. 1 heavy melting steel has been sold into consumption during the past week at \$18 and \$18.50 a ton, making this grade quotable at \$18 to \$18.50, down 25c. from last week's average. Interest in market purchasing is still limited and further clarification is expected this week following closing of railroad lists. Factors in this market tending to prevent spirited fluctuations in scrap prices, such as use of synthetic scrap, higher pig iron percentage in the melt, and utilization of scrap other than No. 1 heavy melting, continue as market influences.

Chicago

Sentimentally this market is stronger, though no mill has yet paid more than \$17.50 a gross ton, delivered, for heavy melting steel. Broker-dealer transactions reveal that \$17.50 is the least that can be paid for No. 1 scrap and some brokers are expecting to pay more soon to cover their orders.

Philadelphia

No. 1 steel was sold this past week at \$19, eliminating last week's 50c. spread on this grade. No. 2 likewise advanced to a flat \$17.50. Recent weakness has completely disappeared. Blast furnace grades are moving at current quotations. Heavy breakable cast is quoted at \$19.50 and machine shop turnings have advanced to \$13.50.

Youngstown

Printed quotations are unchanged here for the fourth consecutive issue, with No. 1 heavy melting steel at \$18.50 to \$19 a ton. During the past week there has been more activity in the market despite regulated shipments at one point. Open-hearth operations remain very strong.

Cleveland

Heavy melting prices are in line here at \$18 to \$18.50 a ton, unchanged from last week's quotation. Other grades show no further weakness. Local railroad list commanded around \$19.50 a ton and went to a Buffalo mill. Ingot production remains strong. During July 18 cargoes of scrap were brought in by vessel, against 20 in June. One shipment left the port each month.

Buffalo

No changes in scrap prices are reported this week. Approximately 6000 tons of No. 2 heavy melting steel was sold to a local consumer at \$16.50 a ton. Brokers are reported reluctant to sell large tonnages of No. 1 heavy melting even at \$19 in the face of mill offers direct to producers at higher prices. Reported purchase of No. 1 railroad heavy melting steel at \$19.50 has not affected the current price range of \$18 to \$18.50 for No. 1. Boatload of 7000 tons of borings arrived from Detroit and a boat carrying about 5000 tons of No. 1 heavy melting came in from Duluth, both for a local consumer.

St. Louis

Hot weather in the St. Louis area has retarded shipments as well as offerings. There is reported to be a much better feeling in the trade, and higher prices are expected on any new buying. A few items are 25c. to 50c. a ton higher.

Birmingham

Quoted prices on No. 1 melting steel have declined from \$16.50 to \$15 and prices on No. 2 heavy melting have

dropped from \$15.50 to \$14. The former prices applied to purchases made the latter part of June.

Cincinnati

Dealers' optimism is largely accountable for the strong undertone now present in the market here. New business is small and infrequent, giving no indication of market trend. With mill operations staying unseasonably high, however, dealers expect a definite buying movement within the next 30 to 60 days.

Detroit

Practically all accumulations of blast furnace scrap in Detroit and surrounding territory are reported to have been moved by lake boat after sales a week ago to two important consumers. Estimates of amount of scrap purchased vary between 25,000 and 50,000 tons with the high figure apparently indicative of the tonnages purchased.

New York

Aside from a 50c. increase in turnings, quotations here are unchanged this week. A pronounced strengthening of the market undertone has been in evidence over the past week, but there has been no business yet to justify price changes. Export loading continues on a more moderate scale than existed two and three weeks ago, with the Japanese limiting themselves to bundles and No. 2 steel.

Boston

No. 1 and No. 2 steel for export are 25c. a ton higher as a result of increased buying despite the softness of the domestic market. Early last week there was a rush to load three boats here for Japan. Since then shipments to that country have ceased, but shipments to England are going forward and are expected to continue.

Toronto

Business was more active in the past week, both as regards consumers' demands and offerings to dealers. Prices, however, held unchanged although some consumers around Orillia are paying more for steel grades. Mills and other large consumers in the Hamilton area have not yet altered their bid prices and as a consequence local dealers are making no revision in lists.

Pacific Coast

Licensing restrictions on the export of No. 1 steel will result in a stronger export demand for No. 2 scrap in the Pacific Coast market, trade sources believe. About 75 per cent of the available West Coast supply falls in No. 2 category, export of which is not subject to license. Customs reports show that 542,092 tons of scrap was shipped from Pacific Coast ports during 1939, chiefly for Japan. During the same period Coast mills used close to 800,000 tons, it is estimated.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.00 to \$18.50
Railroad heavy mltng.	19.50 to 20.00
No. 2 heavy mltng.	16.50 to 17.00
Railroad scrap rails	20.50 to 21.00
Rails 3 ft. and under	22.50 to 23.00
Comp. sheet steel	18.00 to 18.50
Hand bundled sheets	17.00 to 17.50
Heavy steel axle turn.	17.00 to 17.50
Machine shop turnings	13.50 to 14.00
Short shov. turnings	15.00 to 15.50
Mixed bor. & turn.	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Cast iron carwheels	20.00 to 20.50
Heavy breakable cast	16.00 to 16.50
No. 1 cupola cast	19.50 to 20.00
RR. knuckles & coup.	24.50 to 25.00
Rail coil springs	24.50 to 25.00
Rail leaf springs	24.50 to 25.00
Rolled steel wheels	24.50 to 25.00
Low phos. billet crops	23.00 to 23.50
Low phos. punchings	25.00 to 26.00
Low phos. heavy plate	23.00 to 23.50
Railroad malleable	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$19.00
No. 2 hvy. mltng. steel	17.50
Hydraulic bund., new	19.00
Hydraulic bund., old	15.50 to 16.00
Steel rails for rolling	22.00 to 22.50
Cast iron carwheels	20.50 to 21.00
Hvy. breakable cast	19.50
No. 1 cupola cast	21.00 to 21.50
Mixed yard (f'd'y) cast	18.00 to 18.50
Stove plate (steel wks.)	15.50 to 16.00
Railroad malleable	22.50 to 23.00
Machine shop turn.	13.50
No. 1 blast furnace	11.50 to 12.00
Cast borings	11.50 to 12.00
Heavy axle turnings	16.50 to 17.00
No. 1 low phos. hvy.	24.00 to 24.50
Couplers & knuckles	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Steel axles	23.50 to 24.00
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$17.00 to \$17.50
Auto. hvy. mltng. steel alloy free	16.25 to 16.50
No. 2 auto steel	13.75 to 14.25
Shoveling steel	17.00 to 17.50
Factory bundles	16.75 to 17.00
Dealers' bundles	15.25 to 15.50
No. 1 busheling	16.25 to 16.50
No. 2 busheling, old	8.00 to 8.50
Rolled carwheels	20.50 to 21.00
Railroad tires, cut	21.00 to 21.50
Railroad leaf springs	19.50 to 20.00
Steel coup. & knuckles	20.50 to 21.00
Axle turnings	16.25 to 16.75
Coll springs	22.00 to 22.50
Axle turn. (elec.)	17.75 to 18.25
Low phos. punchings	20.50 to 21.00
Low phos. plates 12 in. and under	20.50 to 21.00
Cast iron borings	10.50 to 11.00
Short shov. turn.	11.50 to 12.00
Machine shop turn.	11.50 to 12.00
Re-rolling rails	20.50 to 21.00
Steel rails under 3 ft.	19.75 to 20.25
Steel rails under 2 ft.	21.00 to 21.50
Angle bars steel	20.00 to 20.50
Cast iron carwheels	18.00 to 18.50
Railroad malleable	22.00 to 22.50
Agric. malleable	14.75 to 15.25

Per Net Ton

Iron car axles	23.50 to 24.00
Steel car axles	22.00 to 22.50
Locomotive tires	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast	16.50 to 17.00
Clean auto. blocks	17.25 to 17.75
No. 1 railroad cast	15.00 to 15.50
No. 1 agric. cast	13.50 to 14.00
Stove plate	10.75 to 11.25
Grate bars	12.50 to 13.00
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.50 to \$19.00
No. 2 hvy. mltng. steel	17.50 to 18.00
Low phos. plate	20.50 to 21.00
No. 1 busheling	17.75 to 18.25
Hydraulic bundles	18.00 to 18.50
Machine shop turn.	13.00 to 13.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.00 to \$18.50
No. 2 hvy. mltng. steel	17.00 to 17.50

Comb. sheet steel	\$17.50 to \$18.00
Light bund. stampings	14.50 to 15.00
Drop forge flashings	17.00 to 17.50
Machine shop turn.	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
No. 1 busheling	17.25 to 17.75
Steel axle turnings	17.00 to 17.50
Low phos. billet and bloom crops	23.00 to 23.50
Cast iron borings	12.00 to 12.50
Mixed bor. & turn.	12.00 to 12.50
No. 2 busheling	12.00 to 12.50
No. 1 cupola cast	20.50 to 21.00
Railroad grate bars	14.00 to 14.50
Stove plate	11.00 to 11.50
Rails under 3 ft.	23.00 to 23.50
Rails for rolling	23.00 to 23.50
Railroad malleable	21.50 to 22.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.00 to \$18.50
No. 2 hvy. mltng. steel	16.00 to 16.50
Scrap rails	20.50 to 21.00
New hvy. b'ndled sheets	16.00 to 16.50
Old hydraul. bundles	14.50 to 15.00
Drop forge flashings	16.00 to 16.50
No. 1 busheling	16.00 to 16.50
Machine shop turn.	11.00 to 11.50
Shov. turnings	13.00 to 13.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	22.00 to 22.50
Coil & leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
No. 1 machinery cast	19.50 to 20.00
No. 1 cupola cast	18.00 to 18.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	23.50 to 24.00
Cast iron carwheels	18.00 to 19.00
Railroad malleable	22.00 to 23.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$15.50 to \$16.00
No. 1 hvy. melting	15.00 to 15.50
No. 2 hvy. melting	14.00 to 14.50
No. 1 locomotive tires	17.50 to 18.00
Misc. stand. sec. rails	17.50 to 18.00
Railroad springs	18.50 to 19.00
Bundled sheets	10.50 to 11.00
Cast bor. & turn.	8.50 to 9.00
Machine shop turn.	8.00 to 8.50
Heavy turnings	11.25 to 11.75
Rails for rolling	19.50 to 20.00
Steel car axles	21.00 to 21.50
No. 1 RR. wrought	12.00 to 12.50
No. 2 RR. wrought	14.00 to 14.50
Steel rails under 3 ft.	20.75 to 21.25
Steel angle bars	17.25 to 17.75
Cast iron carwheels	17.00 to 17.50
No. 1 machinery cast	18.75 to 19.25
Railroad malleable	18.50 to 19.00
Breakable cast	15.50 to 16.00
Stove plate	11.50 to 12.00
Grate bars	12.00 to 12.50
Brake shoes	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$14.00 to \$14.50
No. 2 hvy. mltng. steel	12.50 to 13.00
Scrap rails for mltng.	19.50 to 20.00
Loose sheet clippings	8.75 to 9.25
Hydrau. b'ndled sheets	13.25 to 13.75
Cast iron borings	5.50 to 6.00
Machine shop turn.	6.50 to 7.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	4.25 to 4.75
Rails for rolling	21.00 to 21.50
No. 1 locomotive tires	15.50 to 16.00
Short rails	21.50 to 22.00
Cast iron carwheels	15.50 to 16.00
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	16.50 to 17.00
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Agricul. malleable	14.50 to 15.00
Railroad malleable	17.50 to 18.00
Mixed hvy. cast	15.25 to 15.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$15.00
No. 2 hvy. melting steel	14.00
No. 1 busheling	13.00
Scrap steel rails	15.00
Steel rails under 3 ft.	17.50
Rails for rolling	17.50
Long turnings	5.00
Cast iron borings	8.50
Stove plate	11.00
Steel axles	18.00
No. 1 RR wrought	12.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels	13.00
Steel car wheels	15.90

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	\$14.25 to \$14.75
No. 2 heavy melting	13.25 to 13.75
Borings and turnings	10.25 to 10.75
Long turnings	9.25 to 9.75
Short shov. turnings	10.50 to 11.00
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast	15.00 to 15.50
Stove plate	11.75 to 12.25
Hydraul. Comp. sheets	16.50 to 17.00
New busheling	15.25 to 15.75
Sheet clips	13.50 to 14.00
Flashings	14.50 to 15.00
Low phos. plate	18.00 to 18.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$14.00 to \$14.50
No. 2 hvy. mltng. steel	12.50 to 13.00
Hvy. breakable cast	15.00 to 15.50
No. 1 machinery cast	17.00 to 17.50
No. 2 cast	15.00 to 15.50
Stove plate	11.00 to 11.50
Steel car axles	20.00 to 20.50
Shafting	20.00 to 20.50
No. 1 RR. wrought	14.50 to 15.00
No. 1 wrought long	13.00 to 13.50
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	16.50 to 17.50
Clean steel turnings*	9.00 to 9.50
Cast borings*	8.50 to 9.00
No. 1 blast furnace	8.50 to 9.00
Cast borings (chem.)	10.00 to 11.00
Unprepared yard scrap	8.00 to 8.50
Light iron	6.00 to 6.50

Per gross ton delivered local foundries:

No. 1 machin. cast	\$18.00 to \$19.00
No. 2 cast	16.00 to 16.50

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$13.75 to \$14.00
Machine shop turn.	7.75 to 8.00
Mixed bor. & turn.	6.00
Bun. skeleton long	11.00 to 11.50
Shafting	18.50 to 18.75
Stove plate	9.65 to 9.75
Cast bor. chemical	8.00 to 8.50

Per gross ton delivered consumers' yards:

Textile cast	\$17.00 to \$20.00
No. 1 machine cast	17.00 to 19.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	\$13.75 to \$14.00
No. 2 steel	12.75 to 13.00

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	\$13.00	\$13.00	\$13.00
No. 2 hvy. mltng. steel	12.00	12.00	12.00
Bundles	11.00	11.00	11.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	\$11.50	\$11.00
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	10.00	9.50
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.50	13.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	\$15.00
No. 2 hvy. mltng. steel	\$13.00 to \$13.50
No. 2 cast	14.00
Stove plate	12.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	\$16.00 to \$16.25
No. 2 hvy. mltng. steel	14.50 to 14.75
Rail (scrap)	16.00 to 16.50

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	\$17.75
No. 2 hvy. mltng. steel	16.50

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings decline to 20,046 tons; new projects lower at 23,845 tons against 33,200 tons last week; plate awards call for 6090 tons.

AWARDS

NORTH ATLANTIC STATES

- 1000 Tons, New York, apartment house for 295 Central Park West, Inc., to American Bridge Co., Pittsburgh.
- 800 Tons, Newport, R. I., explosive manufacturing building and storehouse for United States Navy, to Lehigh Structural Steel Co., Allentown, Pa.
- 680 Tons, Brooklyn, Belt Parkway contract E2, to American Bridge Co., Pittsburgh.
- 490 Tons, Perth Amboy, N. J., bag house and flue for American Smelting & Refining Co., to Belmont Iron Works, Philadelphia.
- 425 Tons, Passaic, N. J., building for Continental Can Co., to Bethlehem Fabricators, Inc., Bethlehem, Pa.
- 400 Tons, Bound Brook, N. J., building for Bakelite Corp., to American Bridge Co., Pittsburgh.
- 400 Tons, York, Pa., flood control project, to Bethlehem Steel Co., Bethlehem, Pa., through Benjamin Foster Co., Philadelphia.
- 385 Tons, Broome County, N. Y., highway bridge PSC-8758, to American Bridge Co., Pittsburgh, through Davis & Stearns.
- 350 Tons, Quincy, Mass., Exchange Building, to Lehigh Structural Steel Co., Allentown, Pa.
- 330 Tons, Somerset, Mass., power house addition to Lehigh Structural Steel Co., Allentown, Pa., through Stone & Webster Construction Co., Boston, contractor.
- 310 Tons, Bayway, N. J., platforms and supports, to Lackawanna Steel Construction Co., Buffalo.
- 265 Tons, Portsmouth, Me., extension to building No. 80 for Navy Yard, to Bethlehem Fabricators, Inc., Bethlehem, Pa.
- 250 Tons, Rochester, N. Y., plant addition for Consolidated Machine Tool Co., to Leach Steel Corp., Rochester.
- 240 Tons, Hagerstown, Md. and Maryland Junction, W. Va., engine house extensions for Western Maryland Railroad, to Phoenix Bridge Co., Phoenixville, Pa.

NORTH ATLANTIC AWARDS

- 200 Tons, Brooklyn, N. Y., scrap metal plant for United States Navy, to A. J. Fitchy.
- 190 Tons, Southport, Conn., bridge No. 36.70 for New York, New Haven & Hartford Railroad Co., to Phoenix Bridge Co., Phoenixville, Pa.
- 185 Tons, Dennisville, N. J., State overpass FAGH-96-B, to Bethlehem Fabricators, Bethlehem, Pa.
- 170 Tons, Philadelphia, sub. battery charging and overhaul shop for United States Navy, to Pittsburgh Bridge & Iron Co., Pittsburgh.

- 130 Tons, Willington, Conn., Willimantic River bridge for State, to American Bridge Co., Pittsburgh.
- 120 Tons, Phillipsburg, Pa., State highway bridge, to American Bridge Co., Pittsburgh.
- 115 Tons, Westminster, Vt., Sabin bridge for State, to American Bridge Co., Pittsburgh.
- 115 Tons, Bridgeport, Conn., bridge No. 32.72, for New York, New Haven & Hartford Railroad Co., to American Bridge Co., Pittsburgh.
- 115 Tons, Troy, N. Y., school building for St. Patrick's Church, to Utica Structural Steel Co., Utica, N. Y.
- 115 Tons, Chemung County, N. Y., State highway bridge FAS RC-40-61, to Lackawanna Steel Construction Co., Buffalo, through Maple City Lumber & Supply Co.
- 110 Tons, Somerset, Me., extension, Montaup Electric Co., to Lehigh Structural Steel Co., Allentown, Pa.
- 100 Tons, Niagara Falls, N. Y., building No. 120, Du Pont Laboratory, to R. S. McMannus Steel Construction Co., Inc., Buffalo; Laur & Mack, Niagara Falls, N. Y., general contractors.
- 100 Tons, Cheektowaga, N. Y., St. Aloysius Gonzaga Catholic Church, to Ernst Iron Works, Buffalo.

SOUTH & SOUTHWEST

- 1960 Tons, Norfolk, Va., two seaplane hangars, to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Engineering Co., Newport News, Va.
- 1660 Tons, Norfolk, Va., three landplane hangars, to Virginia Bridge Co., Roanoke, Va., through Virginia Engineering Co., Newport News, Va.
- 220 Tons, Louisville, Ky., Coca-Cola building, to Louisville Bridge & Iron Co., Louisville, through Sullivan & Cozart.
- 190 Tons, Lee County, Tex., bridge FAGH-684-E1, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 190 Tons, Harris County, Tex., highway bridge, to Peden Iron & Steel Co., Houston, Tex.
- 130 Tons, Coryell County, Tex., bridge CWR-184-1-1, to Alamo Iron Works, San Antonio, Tex.
- 110 Tons, Richmond, Va., bridge repairs P-18377, C & O Railroad Co., to Phoenix Bridge Co., Phoenixville, Pa.

CENTRAL STATES

- 3500 Tons, Venice, Ill., power house for Union Electric Co. of Illinois, divided equally between Mississippi Valley Structural Steel Co., and Stupp Brothers Bridge & Iron Co., both St. Louis, through Stone & Webster Construction Corp., Boston. (Incorrectly reported last week.)
- 700 Tons, Venice, Ill., circulating water piping for Union Electric Co. of Illinois, to Chicago Bridge & Iron Co., Chicago, through Stone & Webster.

- 457 Tons, Detroit, U. S. Post Office garage, to R. C. Mahon Co., Detroit, through Henry Dattner.
- 260 Tons, Chicago, repairs to 63rd Street line, Chicago Rapid Transit Co., to Hansell-Elcock Co., Chicago.
- 255 Tons, Cook County, Ill., subway section 73-SF, to American Bridge Co., Pittsburgh.
- 220 Tons, Milbank, S. D., State* overhead bridge and viaduct, FAGH-119, to Bethlehem Steel Co., Bethlehem, Pa.
- 200 Tons, Cleveland, State bridge No. CU-6-127 at Clifton, Lake and Bulkley Boulevards, to Fort Pitt Bridge Works, Cleveland, through Lombardo Brothers, Cleveland.
- 195 Tons, Vanderburg County, Ind., bridge 1996, to International Steel Co., Evansville, Ind.
- 190 Tons, Cuyahoga County, Ohio, bridge, to American Bridge Co., Pittsburgh.
- 155 Tons, Savanna, Ill., loading plant, ordinance depot, to A. C. Woods & Co., Rockport, Ill.
- 140 Tons, Dayton, Ohio, addition to laboratory building for United States Government, to Indiana Bridge Co.
- 126 Tons, Miami and Darke Counties, Ohio, state bridge, to Burger Iron Works, Akron, Ohio.
- 100 Tons, Dayton, Deeds Carillon Tower, to Burger Iron Works, Akron, through Mellon-Stewart Co., Pittsburgh.
- 100 Tons, Mt. Gilead, Ohio, Morrow County, State bridge, to Fort Pitt Bridge Works Co., Cleveland, through Green & Sawyer Co.

WESTERN STATES

- 420 Tons, Nyssa, Ore., undercrossing, to Bethlehem Steel Co., through Henry L. Horn, Caldwell, Idaho, contractor.
- 360 Tons, Safford, Ariz., Gila River bridge, to Bethlehem Steel Co., through Martin Construction Co., Tucson, Ariz., contractor.
- 230 Tons, Spokane, Wash., court house and customs house, to Willamette Iron Works, Portland, Ore.
- 180 Tons, Friant, Cal., San Joaquin River bridges, H-piling, to Bethlehem Steel Co., San Francisco, through Campbell Construction Co., Sacramento, Cal., contractor.
- 110 Tons, Tongue Point, Ore., bearing piles for seaplane ramp, to Bethlehem Steel Co., Portland, Ore.

CENTRAL STATES

- 700 Tons, Saginaw, Mich., building for Chevrolet Motor Co.
- 400 Tons, Alton, Ill., warehouse, Owens Illinois Glass Co., bids Aug. 13.
- 250 Tons, Cleveland, warehouse and office for Wheelock, Lovejoy & Co.

WESTERN STATES

- 1000 Tons, Los Angeles, Los Angeles River bridge for Los Angeles Junction Railway Co.; bids to United States Engineer soon.
- 1000 Tons, Kettle Falls, Wash., Great Northern

Weekly Bookings of Construction Steel

Week Ended	Aug. 6, 1940	July 30, 1940	July 9, 1940	Aug. 8, 1939	Year to Date	
					1940	1939
Fabricated structural steel awards	20,045	49,100	14,500	19,505	553,025	601,830
Fabricated plate awards	6,090	1,210	8,875	8,050	93,705	107,190
Steel sheet piling awards	2,615	1,630	200	700	30,270	42,445
Reinforcing bar awards	7,925	15,400	8,260	5,395	275,460	293,445
Total Letting of Construction Steel	36,675	67,340	31,835	33,650	952,460	1,045,090

Railroad relocation project, three bridges, bids Bureau of Reclamation, Denver, Aug. 19.

180 Tons, Denver, city airport hangar, bids Aug. 12.

Unstated Tonnage, Coram, Cal., two 250-ton capacity cranes for Shasta Power Plant; bids Sept. 6.

FABRICATED PLATES AWARDS

120,000 Ft., Venice, Ill., welded steel pipe for Union Electric Co. of Illinois, to American Rolling Mills Co., Youngstown, through Western Foundation Co., Chicago.

3765 Tons, Berkeley, Cal., University of California cyclotron, to Columbia Steel Co., San Francisco.

FABRICATED PLATES PENDING PROJECTS

4000 Tons, Cleveland, anti-submarine net tenders for American Shipbuilding Co.

1450 Tons, Sitka and Kodiak Island, Alaska, tanks; Siemens-Drake-Puget Sound, Seattle, contractor.

390 Tons, Los Angeles, pipe line extensions at various southern California points for Metropolitan Water District (Specifications 340), Alternate SC; bids Aug. 14.

250 Tons, Tampa, Fla., elevated water tank, McDill Field, Chicago Bridge & Iron Co., Birmingham, low bidder.

SHEET PILING AWARDS

750 Tons, Tongue Point, Ore., seaplane ramp, to Bethlehem Steel Co., Portland, Ore.

710 Tons, Vicksburg, Miss., dam across the Coldwater River, to Inland Steel Co., Chicago.

600 Tons, Painesville, Ohio, sheet piling for shore protection for Diamond Alkali Co., to Bethlehem Steel Co., Bethlehem, Pa.

266 Tons, St. Joseph, Mich., sheet piling for Pere Marquette Railroad, to Bethlehem Steel Co., Bethlehem, Pa.

160 Tons, State of Oklahoma, state highway department bridge letting, to the Bethlehem Steel Co., Bethlehem, Pa.

130 Tons, Chicago, subway station section D6A to Concrete Steel Co., New York, through Joseph J. Duffy, Chicago.

Cast Iron Pipe

Providence, R. I., has closed bids on 400 tons, Class B pipe, but has made no award as yet. The Warren Foundry & Pipe Corp. was the low bidder.

Fall River, Mass., has awarded a tonnage of 24-in., Class 200, pipe to an unnamed foundry.

Chelmsford, Mass., has floated a \$55,000 water loan, and has contracted with the Warren Foundry & Pipe Corp. for pipe and other equipment. Tonnage and sizes of pipe are withheld.

Carver, Mass., has taken under advisement bids for a water system, and intimates it will readvertise for bids at a later date.

Procurement Department, Boston, has placed 10 cars of 8, 10 and 12-in. pipe for Natick, Mass., and Manchester, N. H., water projects with the Warren Foundry & Pipe Corp.

Fairview, Ga., plans pipe lines for water system and other waterworks installation. Cost about \$75,000. J. B. McCrary Co., Marietta Street Building, Atlanta, Ga., is consulting engineer.

Carlyle, Ill., plans pipe lines for extensions and improvements in water system. Fund of about \$135,000 will be arranged for this and extensions in sewer system.

New Water District being organized near Blue Springs, Mo., headed by Edward Luttrell, Blue Springs, has engaged Henrici-Lowry Engineering Co., 114 West Tenth Street, Kansas City, to make surveys and estimates of cost for water system, including 20 miles of pipe lines and main supply line for connection with water system at Kansas City, and other facilities.

Sour Lake, Tex., is arranging immediate call for bids for pipe lines for water system and other waterworks installation. Bond issue of \$75,000 has been arranged for this and sewage disposal plant. H. L. Thackwell, Longview, Tex., is consulting engineer.

Simmesport, La., plans pipe lines for water system and other waterworks installation, including deep-well pumping machinery and accessories, elevated steel tank and tower and other facilities. Cost about \$38,000. Financing

has been arranged through Federal aid. M. M. Merrick, Marksville, La., is consulting engineer.

Muscatine, Iowa, plans quantity of 2 and 4-in. for extensions in pipe lines for water system in number of city streets. Financing is being arranged through Federal aid.

Ranier, Minn., plans pipe lines for water system and other waterworks installation. Fund of about \$76,000 is being arranged through Federal aid for this and sewage system.

Nelsonville, Ohio, plans pipe lines for, extensions and replacements in water system, and other waterworks installation. Fund of about \$180,000 is being arranged through Federal aid. Burgess & Niple, 568 East Broad Street, Columbus, Ohio, are consulting engineers.

Chauncey, Ohio, plans pipe lines for water system and other waterworks installation, including water-treatment plant. Fund of about \$200,000 is being arranged, partially through Federal aid, for this and sewage system, with sewage-treatment plant. J. J. Morgan, 255 East Broad Street, Columbus, Ohio, is consulting engineer.

Sacramento, Cal., is taking bids August 9 on 255 tons of 4, 6 and 8-in. pipe and 70 gate valves.

Spokane, Wash., is taking bids August 8 on 406 tons of 2, 6 and 8-in. pipe.

San Diego, Cal., has awarded 420 tons of 24-in. pipe to United States Pipe & Foundry Co., San Francisco.

Phoenix, Ariz., has awarded a substantial quantity of 2 to 12-in. universal pipe to Central Foundry Co., Holt, Ala.

Portland, Ore., Bureau of Water Works has awarded 441 tons of 6 and 8-in. pipe to United States Pipe & Foundry Co., San Francisco.

San Diego, Cal., has awarded 139 tons of 6-in. pipe, Classes 150 and 250, to United States Pipe & Foundry Co., San Francisco.

Metropolitan Water District of Southern California, 306 West Third Street, Los Angeles, asks bids August 14 for construction of lateral pipe line extensions in Burbank, Compton, Long Beach, and Torrance involving 960 tons of cast iron pipe under Specifications 340, Alternate CI. F. E. Weymouth is general manager and chief engineer.

Reinforcing Steel

Awards of 7923 tons; 15,200 tons in new projects

AWARDS ATLANTIC STATES

600 Tons, Portsmouth, Va., restaurant and machine shop building extensions, U. S. Navy Yards, to Bethlehem Steel Co., Bethlehem, Pa., through Rust Engineering Co., contractor.

510 Tons, Stamford, Conn., Southfield Village housing project, to Truscon Steel Co., Youngstown, through John H. Eisele Co.

300 Tons, Wilmington, Del., Dupont office building addition, to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., contractor.

288 Tons, Burlington, Vt., Waterman Memorial Building at University of Vermont, to Truscon Steel Co., Youngstown, through E. J. Rappoli Co.

225 Tons, Luzerne County, Pa., highway project, to American Steel & Wire Co., Cleveland.

102 Tons, Dutchess County, N. Y., state project FARC-40-59, to Truscon Steel Co., Youngstown, through P. W. Winkleman.

100 Tons, Quincy, Mass., telephone exchange, to Truscon Steel Co., Boston.

SOUTH AND CENTRAL

536 Tons, Savanna, Ill., powder magazines, to Truscon Steel Co., Youngstown, Ohio, through E. M. Rocho, Freeport, Ill., contractor.

400 Tons, Chicago, extension A. Campbell Soup Co., to the Calumet Steel Co., Chicago, through Avery Brundage, contractor.

354 Tons, Lansing, Mich., mesh for state projects F-73-40 and F-18-20, to Truscon Steel Co., Youngstown.

160 Tons, Limestone County, Tex., State highway project, FAP-137, to Truscon Steel Co., Youngstown, through Cage Bros. and F. M. Reeves & Sons.

113 Tons, Lansing, Mich., mesh for State project F-35-2, to Truscon Steel Co., Youngstown, through Bridgeport Core Sand Co.

WESTERN STATES

1750 Tons, Santa Ana, Cal., Orange County feeder pipe line for Los Angeles Metropolitan Water District (Specifications 335), hot rolled rods, to Columbia Steel Co., San Francisco.

750 Tons, Burbank, Cal., Lockheed-Vega aircraft plant addition, to Ceco Steel Products Co., Los Angeles.

580 Tons, Mare Island, Cal., machine shop foundations at Navy Yard, to Herrick Iron Works, Oakland, Cal., through James I. Barnes, Santa Monica, Cal., contractor.

350 Tons, Ogden, Utah, depot supply building at Hill Field, to Bethlehem Steel Co., through Peter Kiewit & Sons Co., Omaha, Neb., contractor.

110 Tons, Safford, Ariz., Gila River bridge, to Allison Steel Co., Phoenix, Ariz., through Martin Construction Co., Tucson, Ariz., contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

2900 Tons, Brooklyn, N. Y., superstructure, Kingsboro housing; bids due Aug. 7.

2000 Tons, Perry Point, Md., Veterans Hospital buildings; bids due Aug. 7.

550 Tons, Huntingdon County, Pa., bridge, Route 55; bids close Aug. 16.

250 Tons, Bradford County, Pa., State highway project No. R-14; bids due Aug. 9.

SOUTH AND CENTRAL

6000 Tons, Detroit, Mich., FHA housing project, James Herman apartments.

280 Tons, Wheeling, W. Va., Vineyard housing; Don J. Bryum, Inc., low bidder.

150 Tons, Vandalia, Ohio, GMC Aero Products Division building; bids taken July 30.

WESTERN STATES

2000 Tons, San Diego, Cal., Naval shore facilities; M. H. Golden and Walter Trepte, San Diego, contractors.

250 Tons, Vancouver, Wash., courthouse; bids in.

195 Tons, Davis, Cal., College of Agriculture chemistry building; bids Aug. 6.

115 Tons, Los Angeles, improve Los Angeles River, Section VIII; bids soon.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

13,000 Tons, Brooklyn, subway route 110, Section 10; bids Aug. 27.

1600 Tons, New York, grade separation, East 12th Street, for Triboro Bridge Authority.

1500 Tons, Wyalusing Township, Pa., State bridge.

1400 Tons, New York, apartment house for Anthony Campagna.

1200 Tons, Jamestown, N. Y., factory for Metal Equipment Co.; bids Aug. 9.

410 Tons, North East, Pa., State highway bridge; C. E. Knowles, Gowanda, N. Y., low bidder for general contract.

275 Tons, Wallkill, N. Y., State bridge SS40-10.

265 Tons, Salladsburg Township, Pa., State bridges.

250 Tons, Niagara Falls, N. Y., factory building No. 98 for Union Carbide Co., private opening of bids.

175 Tons, Camden, N. J., building for Cooper Hospital.

165 Tons, New York, building alterations for Borden Farm Products Co.

135 Tons, Halifax, Vt., State bridge.

125 Tons, Philadelphia, submarine battery and overhaul shop for United States Government.

115 Tons, Washington, reconstruction, building for St. Peter's Church.

THE SOUTH

450 Tons, Charleston, W. Va., office building for United Carbon Co.

140 Tons, Charleston, W. Va., post office building for United States Government.

Pipe Lines

United States Engineer Office, Second District, New Orleans, closes bids Aug. 12 for eight lengths of 30-in. inside diameter steel suction pipe, six lengths to be 20 ft. long, and two lengths, 10 ft. (Circular 30).

Gueydan, La., plans steel pipe line system for natural gas distribution, including main welded steel pipe line for connection with supply source. F. P. Joseph, Glenmora, La., is consulting engineer.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for pipe lines and accessories for gasoline distribution system at naval air station, Jacksonville, Fla., including steel tanks, control equipment and electrical installation (Specifications 9893).

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =	3.00¢)				2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =	3.35¢)				3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES										(Coatesville and Claymont = 2.10¢)					
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢										
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢										
Spring	3.20¢	3.20¢		3.20¢	3.20¢										
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terra Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in. to 8 in.\$54.00
8 in. to 12 in. 52.00
12 in. to 18 in. 54.00
18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C....	\$6.00	\$12.00
15-lb. coating I.C....	7.00	14.00
20-lb. coating I.C....	7.50	15.00
25-lb. coating I.C....	8.00	16.00
30-lb. coating I.C....	8.63	17.25
40-lb. coating I.C....	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails\$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.

Annealed fence wire\$3.05

Base Column

Woven wire fence* 67
Fence posts (carloads) 69
Single loop bale ties 56
Galvanized barbed wire† 70
Twisted barbless wire 70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
½ in. and 6 in. and smaller... 68½
Larger and longer up to 1 in... 66
1½ in. and larger..... 64
Lag bolts 66

Plow bolts, Nos. 1, 2, 3, and 7... 68½
Hot pressed nuts; c.p.c., t-nuts;
square, hex., blank or tapped:
½ in. and smaller..... 67
9/16 in. to 1 in. inclusive..... 64
1½ in. to 1½ in. inclusive..... 62
1½ in. and larger..... 60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller.....	67	70
9/16 to 1 in.....	64	65
1½ in. through 1½ in..	62	62
1½ in. and larger.....	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 75 and 10

Stove bolts in packages, with nuts attached 75

Stove bolts in bulk..... 83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 10

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws,
1 in. dia. and smaller..... 50 and 10
Milled headless set screws, cut
thread ¼ in. and larger..... 64
3/16 in. and smaller..... 73
Upset hex. head cap screws U.S.S.
or S.A.E. thread 1 in. and
smaller 70
Upset set screws, cup and oval
points 75
Milled studs 52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 31	Aug. 1	Aug. 2	Aug. 3	Aug. 5	Aug. 6
Copper, Electrolytic¹	11.50	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	52.75	52.625	52.00	52.25	52.25	52.25
Zinc, East St. Louis²	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis³	4.85	4.85	4.85	4.85	4.85	4.85

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	53.25	56.50
Copper		
Lake	13.25	12.625
Electro	12.75	12.625
Castings	12.375	12.375
H. R. sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow, sheets*	18.56	18.56
Yellow, rods*	13.55	13.55
Seamless tubes*	21.31	21.31
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks..	12.00	12.00
Lead		
American pig	6.10	5.50
Bar	8.05	8.25
Cut sheets.....	8.25	8.25

Antimony
Asiatic 16.00 17.00

Aluminum
Virgin, 99% 20.00 21.00
No. 1 remelt., 98-99% 18.00 18.50

Solder
½ and ½ 32.125 32.50

Babbitt
Anti-friction grade.. 22.25 22.00

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible ...	8.875	9.50
Hvy. and wire ...	7.785	8.25
Light and bottoms	6.875	7.375
Brass		
Heavy	4.875	5.375
Light	3.875	4.625
No. 1 yel. turn...	4.50	5.50
No. 1 red or compo. turnings	7.375	7.875
Hvy. Mach. compo.	7.625	8.25
Lead		
Heavy	4.00	4.375
Aluminum		
Cast	8.00	9.00
Sheet	13.00	14.00
Zinc	3.25	4.00

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 18c.-19c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb. New York; American, 13c. a lb. f.o.b. smelter. QUICK-SILVER, \$188-\$190 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.75c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33½; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Series Numbers
2000 (1.5 Ni)\$0.35

Alloy Differential, per 100 Lb.

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)..	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)....	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip.....	23.50c.	21.50c.
Cold rolled strip.....	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars ..	18.50c.	19.00c.	22.50c.	27.50c.
Plates ..	21.50c.	22.00c.	25.50c.	30.50c.
Sheets ..	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed .....	.67c.
High-carbon-chromium .....	.43c.
Oil-hardening .....	.24c.
Special .....	.22c.
Extra .....	.18c.
Regular .....	.14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago..	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.



GAIRING




Heavy Duty, Inverted Spotfacers and Counterbores

provide balanced drive with equalized strength. The pilot bar aligns the cutter. Hexagon socket in the cutter, co-acting with the hexagon pilot shank, assures a positive, sturdy drive that is capable of handling heavy cuts on castings and forgings. Pilots are supplied with straight or tapered shanks with keeper key slot.

Our long engineering experience... modern production facilities... complete stock of standard tools... all at your service.

Use them!

The Gairing Tool Co., Detroit, Michigan
In Canada, Hi-Speed Tools Ltd., Galt, Ont.

SPECIALISTS IN FINE CUTTING
TOOLS FOR 24 YEARS

The heavy duty, inverted spotfacer and counterbore illustrated in the above advertisement is described in great detail on pages 28 and 29 of Gairing Catalogue No. 40. For complete information turn to those pages.

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial
Boiler Tubes and Locomotive Tubes.
Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pitts-
burgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82	....
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26	....
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23	\$9.72
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54	13.79
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01	15.16
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 1/4 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4 1/2 in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.....	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District
and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron
pipe)

Base Price=\$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
1/8 in.	56	36
1/4 to 3/8 in.....	59	43 1/2
1/2 in.	63 1/2	54
3/4 in.	66 1/2	58
1 to 3 in.....	68 1/2	60 1/2

Wrought Iron

	Black	Galv.
1/4 and 3/8 in.....	+9	+30
1/2 in.	24	6 1/2
3/4 in.	30	13
1 and 1 1/4 in.....	34	19
1 1/2 in.	38	21 1/2
2 in.	37 1/2	21

Lap Weld

Steel		
2 in.	61	52 1/2
2 1/2 and 3 in.....	64	55 1/2
3 1/2 to 6 in.....	66	57 1/4
7 and 8 in.....	65	55 1/2
9 and 10 in.....	64 1/2	55
11 and 12 in.....	63 1/2	54

Wrought Iron

2 in.	30 1/2	15
2 1/2 to 3 1/2 in.....	31 1/2	17 1/2
4 in.	33 1/2	21
4 1/2 to 8 in.....	32 1/2	20
9 to 12 in.....	28 1/2	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	41 1/2
1/4 to 3/8 in.....	56 1/2	45 1/2
1/2 in.	61 1/2	53 1/2
3/4 in.	65 1/2	57 1/2
1 to 3 in.....	67	60

Wrought Iron

1/4 and 3/8 in.....	+10	+43
1/2 in.	25	9
3/4 in.	31	15
1 to 2 in.....	38	22 1/2

Lap weld, extra strong, plain ends

Steel	Black	Galv.
2 in.	59	51 1/2
2 1/2 and 3 in.....	63	55 1/2
3 1/2 to 6 in.....	66 1/2	59

	Black	Galv.
7 and 8 in.....	65 1/2	56
9 and 10 in.....	64 1/2	55
11 and 12 in.....	63 1/2	54

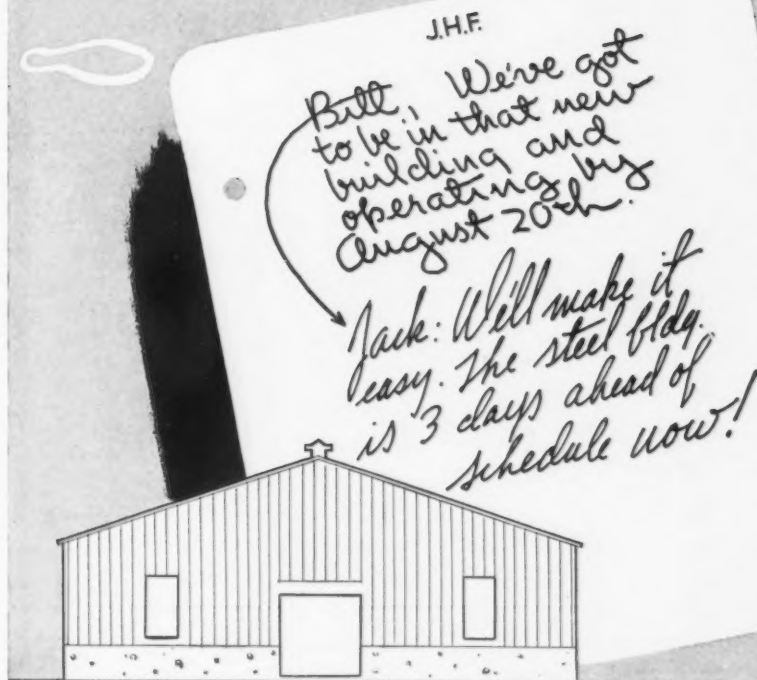
Wrought Iron

2 in.	33 1/2	18 1/2
2 1/2 to 4 in.....	39	25 1/2
4 1/2 to 6 in.....	37 1/2	24
7 and 8 in.....	38 1/2	24 1/2
9 to 12 in.....	32	20 1/2

On butt weld and lap weld steel pipe
jobbers are granted a discount of 5%. On
less-than-carload shipments prices are de-
termined by adding 25 and 30% and the
carload freight rate to the base card.

F.o.b. Gary prices are two points lower
discount or \$4 a ton higher than Pitts-
burgh or Lorain on lap weld and one
point lower discount, or \$2 a ton higher,
on all butt weld 8 in. and smaller.

UP IT GOES
... and in YOU go!



• In these days of short-notice orders for warehouse and factory facilities, new buildings have to meet production schedules. Here is where you can rely on the construction of metal buildings...

When you must build or remodel in a hurry, let us quickly put you in touch with experienced manufacturers of steel buildings. You'll get these advantages in a metal building: fast,

easy erection; insulated walls and roofs that keep out heat and cold; protection against fire and lightning, and high salvage value.

Or your own contractor can obtain ARMCO Sheet Metals from your nearby ARMCO Distributor. Write us for information about ARMCO iron and steel sheets used in building construction. The American Rolling Mill Co., 2260 Curtis St., Middletown, Ohio.



ARMCO IRON AND STEEL SHEETS

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50% ..	\$4.75
Old range, non-bessemer, 51.50% ..	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50% ..	4.45
High phosphorus, 51.50%	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe.....	12c.
--	------

Caucasian, washed, 52% Mn.....	60c.
African, Indian, 44 to 48% Mn...	50c.
African, Indian, 49 to 51% Mn...	55c.
Brazilian, 46 to 48% Mn.....	53c.
Cuban, del'd, duty free, 51% Mn.	72c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....	\$23.50
Tungsten, domestic scheelite, delivered	23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)...	Nom.
Rhodesian, 45%	\$23.50
Rhodesian, 48%	27.50

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.....	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads...	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)...	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....	\$20.00 to \$21.00
Domestic, f.o.b. Ohio River landing barges	\$20.00 to \$21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..	\$20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid. ...	\$25.00 to \$25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	\$31.00
As above, in bags, f.o.b. same mines	\$32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis..	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey.....	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois.....	42.75
Second quality, New Jersey....	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton.....	7.10

Silica Brick

Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	\$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	\$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	\$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.



ANOTHER CUT IN CLEANING COSTS

● It's getting to be almost as regular as the action of a well-oiled buzz-saw—this cutting of metal pre-cleaning costs with a Wyandotte Solvent Detergent.

For example: A company which formerly used a commercial alkali (sodium meta silicate) for pre-cleaning washing machine parts found the cost per machine was \$2.40 a day.

Then they switched to a Wyandotte Solvent Detergent.

They now pre-clean the parts at a saving of \$1.69 a day (\$423 per year, per machine), and report that a better finish results, and that the life of electro cleaner baths is longer because of efficient pre-cleaning.

Call your Wyandotte Service Representative now. He'll be glad to show you how you can save money with a Wyandotte Solvent Detergent. Write us for further information.

Wyandotte

THE J. B. FORD SALES CO.

SERVICE REPRESENTATIVES IN 88 CITIES

WYANDOTTE MICH.

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton
Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%.....49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size
50% (carload lots, bulk).....\$74.50*
50% (ton lots, packed).....87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio
10.00 to 10.50%.....\$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio
5.00 to 5.50%.....\$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon.....17.50c.
1% carbon.....18.50c.
0.10% carbon.....20.50c.
0.06% carbon.....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon.....\$113.00*
2.50% carbon.....118.00*
2% carbon.....123.00*
1% carbon.....133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd \$2.70 to \$2.90†
Ferracolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots..... \$2.25†
Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....\$142.50

*Spot prices are \$5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton.....\$58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville.....\$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace.....95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace.....80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

Per Gal.
No. 3, f.o.b. Bayonne, N. J.....4.75c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland 5.25c.
No. 4 industrial, del'd Cleveland 5.00c.
No. 5 industrial, del'd Cleveland 3.75c.
No. 6 industrial, del'd Cleveland 3.25c.



*Behind the first line
of DEFENSE*
**ERIE DROP
HAMMERS**

This Erie Broad Drop Hammer is one of a battery for small forgings.

Here are two of a number of Erie drop hammers in the shops of the Aluminum Company of America. The finest aluminum forgings, propeller blades, crank cases, etc., are turned out for aircraft production on these Dependable Erie Hammers. Your copy of the new Erie composite catalog showing all classes of Erie Hammers is awaiting your request.

Here a skilled craftsman is finishing the die for engine crankcase forgings.

This Erie Steam Drop Hammer is forging a propeller blade.



ERIE FOUNDRY CO.
ERIE, PENNSYLVANIA, U. S. A.

DETROIT 335 Curtin Bldg.	CHICAGO 549 Washington Blvd.	INDIANAPOLIS 335 Postal Station Bldg.
FRANCE Pensnick, S. A.	CANADA John Bertram & Sons Co., Ltd.	ENGLAND Burton, Griffiths & Co., Ltd.

ERIE BUILDS Dependable HAMMERS

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$4.25 to \$4.50
Foundry, f.o.b. Connellsville, prompt	\$5.25 to 5.50
F'dry, by-product, Chicago....	10.50
F'dry, by-product, New England	12.50
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia	11.13
F'dry, by-product, Cleveland...	11.05
F'dry, by-product, Cincinnati..	10.50
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	\$10.75 to \$11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....	\$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export.	£17 18s.
Tin plate, per base box 32s. to 33s.	
Steel bars, open hearth	£13 9s.
Beams, open hearth....	£12 2s. 6d.
Channels, open hearth..	£12 2s. 6d.
Angles, open hearth....	£12 2s. 6d.
Black sheets, No. 24 gage	£18 17s. 6d. max.*; £18 17s. 6d. min.**
Galvanized sheets, No. 24 gage	£19 10s. max.*; £19 10s. min.**

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	\$24.50	\$24.00	\$25.50	\$25.00	.....
Brooklyn	26.50	.....	.....	27.00	.....
Jersey City	25.53	25.03	26.53	26.03	.....
Philadelphia	24.84	24.34	25.84	25.34	.....
Bethlehem, Pa.	\$24.00	\$23.50	\$25.00	\$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa. ....	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	23.44	23.61	.....	24.11	.....
Canton, Ohio	24.39	23.89	24.89	24.39	.....
Mansfield, Ohio	24.94	24.44	25.44	24.94	.....
St. Louis	23.50	23.02	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	25.63	.....	26.13	25.63	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle...	27.50	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....\$22.50

CHARCOAL

Lake Superior fce.....\$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.15	\$3.05	\$3.15	\$3.35	\$3.38	\$3.23	\$3.05	\$3.51	\$3.45	\$3.18	\$3.30	\$3.48	\$4.30
Sheets, cold rolled .....	.....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	.....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4.42	4.50	4.30	4.64	4.00	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	.....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	.....	3.41	3.83	3.54	.....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	.....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	.....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100.	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.23.

**THERE'S OIL IN THE HEART
OF EVERY LINK**

**MORSE
ROLLER CHAIN**

**CHANNEL
LUBRICATED
INTERCHANGEABLE**

- The Morse channel lubrication design builds a "force feed" oil system in every link. The chain's movement leads oil to the heart of the chain—the pin and bushing surfaces. Positive lubrication cuts wear, lengthens chain life.

Morse channel-lubricated roller chain is interchangeable with every other standard round-pin roller chain.

Morse construction includes: rollers, pins, and bushings of

special alloy steels, case hardened; tighter pin and bushing fits in side plates; a better strength balance throughout the chain.

For longer life and smooth, efficient operation, choose Morse Roller Chains.

GET NEW ROLLER CHAIN DATA BOOK
Bulletin R54—Engineering and operating data, construction and performance specifications on Morse Roller Chain. Write today for this helpful, informative bulletin.

Photograph shows Morse Roller Chain drives on a huge wire screen weaving machine.

SILENT CHAINS ROLLER CHAINS FLEXIBLE COUPLINGS KELPO CLUTCHES

MORSE *positive* DRIVES

MORSE CHAIN COMPANY, ITHACA, N. Y. DIVISION BORG-WARNER CORP.

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

• **Continental Can Co.**, 100 East Forty-second Street, New York, has let general contract to Austin Co., Cleveland, for four-story and basement addition, 150 x 200 ft., to branch plant at Chicago. Cost over \$200,000 with equipment. Chicago offices are at 111 West Washington Street. W. A. Taylor, 4622 West Grand Avenue, Chicago, is company architect.

• **Silent Hoist, Winch & Crane Co.**, 841 Sixty-third Street, Brooklyn, has taken over former plant of New England Box Co., Milford, Conn., and will modernize for new works. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

• **Bureau of Yards and Docks**, Navy Department, Washington, has let general contract to Walter Kidde Constructors, Inc., 140 Cedar Street, New York, for one-story sub-assembly shop, extensions and improvements in certain existing shops, and new steel storage runways at Brooklyn Navy Yard. Cost about \$1,520,000 exclusive of equipment.

• **American Brake Shoe & Foundry Co.**, 230 Park Avenue, New York, has asked bids on general contract for one-story addition to branch plant at Mahwah, N. J., 50 x 110 ft. Cost over \$65,000 with equipment.

• **Vladimir M. Eltington**, 160 Fifth Avenue, New York, operating a machine trade school, has leased a floor in building at 260-62 West Fifty-first Street and will equip for new instruction shop.

• **Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 13 for flame safety lamps, oil-burning lanterns, oil-burning deck lanterns, etc. (Schedule 2485) for Brooklyn Navy Yard; until Aug. 16, 21,000 air-speed indicators (Schedule 2531) for Philadelphia yard; until Aug. 20, hexagon steel nuts (Schedule 2567) for Brooklyn and Mare Island yards.

• **Triangle Conduit & Cable Co., Inc.**, 92-27 Horace Harding Boulevard, Elmhurst, L. I., electric wires and cables, has let general contract to Brown & Matthews, Inc., 122 East Forty-second Street, New York, for new one-story plant at New Brunswick, N. J. Cost close to \$400,000 with equipment.

• **Canada Dry Ginger Ale, Inc.**, 100 East Forty-second Street, New York, has let general contract to R. E. Runnels Construction Co., 24 Merrimack Street, Lowell, Mass., for new one-story factory branch, storage and distributing plant at Chelmsford, Mass., 110 x 230 ft., with extension 65 x 100 ft. Cost close to \$100,000 with equipment. W. H. Corey, first noted address, is company engineer.

• **Wright Aeronautical Corp.**, Paterson, N. J., plans new works near Hamilton, Ohio, for parts production and assembling with capacity of about 1000 engines per month. Output will be largely for Federal Government and part of loan of \$92,000,000, recently secured by company from RFC, will be used for construction.

• **Joseph T. Ryerson & Son, Inc.**, 203 West-side Avenue, Jersey City, N. J., iron and steel products, has let general contract to James Mitchell, Inc., 575 Westside Avenue, for one-story addition, 65 x 100 ft., for storage and distribution. Cost about \$45,000 with equipment. Main offices are at Chicago.

• **Lawrence Engineering & Research Corp.**, Vreeland Mills Road, Linden, N. J., aircraft engines and parts, has let general contract to Brown & Matthews, Inc., 122 East Forty-second Street, New York, for one-story addition, 80 x 142 ft., for production of new light-type airplane engine, including parts manufacture and assembling. Cost about \$60,000 with equipment.

• **Delaware Alloy Steel Co.**, 2300 East Tioga Street, Philadelphia, has let general contract to Charles F. Rohleder, 2134 Cherry Street,

for one-story addition. Cost over \$45,000 with equipment. Carson & Carson, Commercial Trust Building, are engineers.

• **Pennsylvania Tool & Mfg. Co.**, Hartman Street, York, Pa., has let general contract to Dietz A. Smith, York, for one-story addition. Cost about \$40,000 with equipment.

• **Heat Exchangers Corp.**, Scranton, Pa., L. J. Bourd, 329 Taylor Avenue, head, organized to manufacture heating equipment, has acquired former one-story plant of Finch Mfg. Co., West Linden Street, for new works.

Buffalo District

• **E. I. du Pont de Nemours & Co.**, R. & H. Chemicals Division, Buffalo Avenue, Niagara Falls, N. Y., has asked bids on general contract for three-story and basement addition, 70 x 115 ft. Cost over \$85,000 with equipment.

• **J. P. Danielson Co., Inc.**, Allen Street, Jamestown, N. Y., wrenches, etc., has let general contract to Warren Construction Co., 335 Steele Street, for one-story addition. Cost close to \$50,000 with equipment.

• **Village Council**, Wellsville, N. Y., and Board of Wellsville Township Commissioners, Wellsville, plan steel hangars with shop and reconditioning facilities, and other buildings at municipal airport. Cost over \$100,000. E. J. Rowe is village engineer.

Canada

• **Guelph Stove Co., Ltd.**, York Street, Guelph, Ont., plans two-story addition, 50 x 125 ft. Cost close to \$75,000 with equipment.

• **Nee-pawa Salt, Ltd.**, an interest of Canadian Industries, Ltd., 372 Bay Street, Toronto, plans new salt-mining and refining plant at Nee-pawa, Man., with machine shop, power station and other structures. Cost about \$350,000 with equipment.

• **Beaver Wood Fibre Co., Ltd.**, Allanburg Road, Thorold, Ont., manufacturer of newsprint, has let general contract to Timms Construction Co., Ltd., 221 Bargar Street, Welland, Ont., for one-story addition to paper mill, 155 x 180 ft. Cost close to \$100,000 with equipment.

• **MacDonald Brothers Aircraft, Ltd.**, Robinson Street, Winnipeg, Man., plans one-story addition for parts production and assembling, to be used largely for aircraft for Dominion Government, which will participate in project. Cost about \$500,000 with machinery.

New England

• **Norma-Hoffmann Bearings Corp.**, Stamford, Conn., ball and roller bearings, has let general contract to Vuono Construction Co., 217 Bedford Street, for one-story addition, 60 x 120 ft., including new boiler house. Cost over \$65,000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

• **Commanding Officer**, Ordnance Department, Springfield Armory, Springfield, Mass., plans purchase of machine tools for arsenal service; also for machine gun tripod mounts, machine guns of cal. 50 and cal. 30, automatic pistols, signal projectors and other equipment. Appropriations have been authorized.

• **Bath Iron Works, Inc.**, Bath, Me., plans expansion and improvements in shipbuilding plant. Cost over \$200,000 with equipment. Morton C. Tuttle Co., Park Square Building, Boston, is engineer and contractor.

• **Standard Foundry Co.**, 25 Southgate Street, Worcester, Mass., is erecting a plant addition. E. J. Cross Co., 150 Prescott Street, Worcester, is contractor.

• **Springfield Bronze & Aluminum Co.**, Page Boulevard, Springfield, Mass., is having plans revised for a foundry addition. H. L. Sprague, 1570 Main Street, Springfield, is engineer.

Washington District

• **Purchasing and Contracting Officer**, Holabird Quartermaster Depot, Baltimore, asks bids until Aug. 23 for axles, engine assemblies, gears, grommets, rivets, screws, springs, brakes, fenders, washers, lock washers, wire and other equipment (Circular 398-16).

• **City Council**, Hagerstown, Md., asks bids until Aug. 15 for two steam-generating units and auxiliary equipment for expansion in municipal electric power plant. Cost about \$260,000. Wood & Kirkpatrick, Stock Exchange Building, Philadelphia, are consulting engineers.

• **Chief of Bureau of Ordnance**, Navy Department, Washington, asks bids until Aug. 15 for 7,000,000 1.1-in. projectiles.

• **Bureau of Yards and Docks**, Navy Department, Washington, plans new fuel oil storage tanks and facilities at Midway Island Naval Station, to cost about \$250,000; also storage tanks and facilities for diesel oil, cost \$50,000. An additional fund of \$1,250,000 has been authorized for shops and other buildings at same station.

• **Bristol Aircraft Corp.**, Bristol, Va., recently organized with capital of \$500,000 by C. C. Lincoln, Jr., Marion, Va., and associates, has acquired former plant of Lincoln Furniture Co., Commonwealth Avenue, Bristol, for new plant for production of aircraft and aircraft equipment, including engines and parts. Mr. Lincoln, noted, will be vice-president.

• **Quartermaster General**, Army Department, Washington, plans expansion and improvements in Lowry Field air base, Denver, including hangars and other facilities. Appropriation of \$350,000 has been authorized.

• **Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 13 for steel rivets and washers (Schedule 2509), brass and steel bolts and nuts (Schedule 2492), steel shelving and steel storage racks (Schedule 2486), wire brushes (Schedule 2502), for Eastern and Western yards; sheet metal screws (Schedule 2462) for Sewall's Point, Va.; Mare Island and Puget Sound yards; until Aug. 16, 41 motor-driven engine lathes (Schedule 2523) for Philadelphia, Mare Island and Eastern and Western yards.

South Atlantic

• **Jeffords Machine Co.**, Orangeburg, S. C., machinery and parts, has approved plans for new one-story machine shop, 80 x 220 ft., at Broad and North Broughton Streets. Cost about \$45,000 with equipment.

• **Fisher Body Division**, General Motors Corp., McDonough Road and Lakewood Avenue, S. E., Atlanta, Ga., has let general contract to Barge-Thompson Co., 136 Ellis Street, for one-story addition to plant at Chevrolet Motor Division assembling works, location noted, and improvements in present structure. Cost over \$75,000 with equipment. Main offices are at Detroit.

• **Sunny State Oil Co.**, Panama City, Fla., plans rebuilding bulk oil storage plant on Watson's Bayou, including steel tanks and other facilities, recently destroyed by fire. Loss over \$150,000 with equipment.

South Central

• **Mississippi Road Supply Co.**, Jackson, Miss., road construction equipment, has asked bids on general contract for one-story storage and distributing plant. Cost about \$45,000 with mechanical-handling facilities. R. W. Naef, 411 East Capitol Street, is architect.

• **Coca-Cola Bottling Co.**, 1538 Bank Street, Louisville, has let general contract to Sullivan & Cozart, 314 Armory Place, for new two-

OPPORTUNITIES TO WIDEN PROFIT MARGINS



HOW AUTOMOBILE MANUFACTURERS LOWER UNIT COST OF MANUFACTURING

UNIT type machines, as seen across the bottom of this advertisement, have a wide application for boring, drilling, tapping, and kindred operations on automobile components. These machines avoid a hurried obsolescence in a fast changing industry because they are built from standard units which are easily readjusted to meet design changes in automobile parts. You can accommodate future design changes with only tool head and fixture purchases. Amortize these faster than a complete machine, making it easier to get your equipment appropriation.

W. F. & JOHN BARNES CO. • ROCKFORD, ILLINOIS



SAVED 35 DAYS Per Week

A MANUFACTURER of tools used in oil drilling was obtaining eight complete parts per eight hour day. After installation of a Barnes unit type machine, he secures eight complete parts every hour—280 more parts per week.

The machine is semi-automatic—performs drilling, facing, hollow milling, and tapping operations simultaneously. It accommodates 19 different parts.

Write for our booklet "Since 1872" to see how machines of this type are serving other industries.

W. F. & JOHN BARNES CO. ROCKFORD • ILLINOIS



HIGH SPEED RIFLE BARREL REAMING

OVER one hundred rifle barrels reamed every hour. The machine accommodates barrels ranging from 22 to 50 caliber. In addition, drilling, chambering and crowning machines can be furnished.

Write for our "Rifle" folder.

W. F. & JOHN BARNES CO., ROCKFORD, ILL.



To Profit More Sell It for Less

This machine bores, counterbores, faces, drills and taps seven holes in washing machine parts—total time 60 seconds each. It's one of seven of our machines in daily operation for this progressive manufacturer. Why? Product cost and price are lowered, opening wider markets, and establishing a higher profit margin.

Write for our booklet "Since 1872 . . ."

W. F. & JOHN BARNES CO., ROCKFORD, ILL.

WANTED

Men interested in seeing the flexibility in application of unit type machine tools, to write for our booklet "Since 1872 . . ."

W. F. & JOHN BARNES CO., ROCKFORD, ILL.



How Can Airplane Production Be Increased?

PRESENT demands in airplane manufacturing necessitate the use of special machine tools. Two Barnes unit-type production machines recently furnished for airplane engine parts are shown to the left. These are significant of the inevitable trend towards high production methods in aircraft manufacturing. Our "Aircraft" booklet illustrates several outstanding machines designed and built for a "straight in line" engine—write for your copy.



W. F. & JOHN BARNES CO., ROCKFORD, ILL.



35% SAVINGS

TEN YEARS of continuous operations of drill, counterbore, face and hollow mill is the record of this one installation. Over 4,000,000 pencil sharpener bases have been machined—the original savings was 35%.

Many other manufacturers are saving on unit costs with unit type special machine tools. You'll see some of these in our booklet "Since 1872 . . ."—a copy of which will be mailed upon request.

W. F. & JOHN BARNES CO., ROCKFORD, ILL.



TO SHORTEN A FARMER'S DAY

OF all the modern implements used by farmers, the tractor is perhaps the most useful in saving time and labor. Most tractor manufacturers in this country have one or more Barnes unit type machines for lowering manufacturing costs—thereby making tractors available to more farmers.

Your product may not be tractors, but you can probably expand your market by lowering manufacturing costs. Unit type special machine tools will help you do this. Write for our booklet "Since 1872 . . ."

W. F. & JOHN BARNES CO., ROCKFORD, ILL.



HOW TO BUILD YOUR OWN PRODUCTION MACHINE TOOLS

You can mount these hydraulic, self-contained units on new, or existing machine beds—at any required angle. Available in sizes from one to thirty horsepower for drilling, boring, milling, etc. Design your own fixture and spindle head and apply these units for a profit making machine tool. Write for our "SH-75" folder.

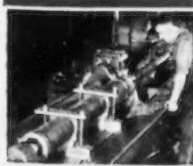
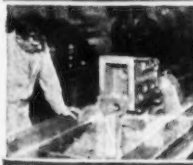
W. F. & JOHN BARNES CO., ROCKFORD, ILL.

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THIS MACHINE both bores and hones. Yet, costs but little more than one designed for only one of these operations. Consequently, the investment required for a complete machine is saved with your initial purchase. Subsequent savings will be realized in its range of cylinder bores and lengths. The illustrations show the this machine is used. Long and short bores are both bored and two operations so that each can be done accurately and quickly several new design features. These are described in our "Horizontal Boring and Honing" booklet which will be sent to you upon request.



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story and basement mechanical-bottling, storage and distributing plant, 200 x 250 ft., at Seventeenth and Hill Streets, with one-story service and garage building. Cost over \$100,000 with equipment. Jesse M. Shelton, Bona Allen Building, Atlanta, Ga., is architect.

City Council, Madisonville, Ky., is completing surveys for new municipal light and power plant. Cost about \$450,000 with equipment. Proposed to arrange bond issue in that amount. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Constructing Quartermaster, Godman Field, Fort Knox, Ky., has appropriation of about \$740,000 for expansion at local air field, including hangars with shop and repair facilities, oil and gasoline storage units, oil and dope building, and other structures.

Southwest

● **Alton & Southern Railroad**, 3105 Missouri Avenue, St. Louis, plans new grain elevator and accessory structures near its local Fox Terminal on Mississippi River. Cost close to \$1,000,000 with elevating, conveying, screening and other mechanical equipment.

Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, will convert present branch assembling, storage and distributing plant at 129 Belmont Boulevard, Kansas City, Mo., into a complete battery-manufacturing works. Present one-story building, 160 x 200 ft., will be remodeled and one-story addition erected, 130 x 200 ft.; also will build new loading dock, 8 ft. wide and 165 ft. long, with new power substation and other expansion. Bids are being asked on general contract. Cost close to \$250,000 with equipment. John R. Brunt, Emil O. Bayerl and Charles H. Bleistein, New York Life Building, are architects; William Cassell, 912 Baltimore Avenue, is mechanical engineer, all Kansas City.

City Council, Neodesha, Kan., plans extensions and improvements in municipal power plant, including new 1000-hp. engine-generator unit and auxiliary equipment. Cost about \$112,000. Special election has been called to vote bonds in that amount.

Phoenix Refining Co., Raymond Russell, 4527 Somerset Street, San Antonio, Tex., head, has approved plans for new gasoline refinery in Long Lake oil field district, near Palestine, Tex., to process about 2000 bbl. of crude oil per day. Cost close to \$100,000 with machinery.

Central Power & Light Co., San Antonio, Tex., has plans for addition to steam-electric generating station at Corpus Christi, Tex., installation to include new 15,000-kw. turbine-generating unit and accessories, high-pressure boiler and auxiliary equipment. Cost over \$2,000,000 with equipment. Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, is consulting engineer.

Campbell, Wise & Wright Co., Robstown, Tex., fruit packer, plans new one-story processing and packing plant at Crystal City, Tex. Cost about \$45,000 with equipment.

Western Pa. District

● **Mine Safety Appliances Co.**, 201 North Braddock Avenue, Pittsburgh, mine safety equipment, has asked bids on general contract for two-story addition. Cost close to \$50,000 with equipment. Prack & Prack, Martin Building, are architects.

United States Engineer Office, New Post-office Building, Pittsburgh, asks bids until Aug. 16 for three four-way valves, with operating handwheel, etc., for Mahoning dam; also for four similar valves for Loyalhanna dam (Circular 5).

Aetna-Standard Engineering Co., Ellwood City, Pa., iron and steel products, has let general contract to J. L. Joyce Construction Co., 154 Roslyn Drive, Youngstown, Ohio, for one-story addition, 100 x 350 ft., for production of anti-aircraft guns for Government; also for new boiler house. Cost close to \$375,000, instead of smaller sum previously noted.

Ohio and Indiana

● **Steel Storage File Co.**, 2216 West Sixty-third Street, Cleveland, steel storage equipment, plans new one-story plant, 80 x 800 ft., on East Bowman Street, Wooster, Ohio, with removal of present works to that location and additional facilities for increased capacity. Cost over \$150,000 with equipment.

John C. Virden Co., 6103 Longfellow Avenue, Cleveland, manufacturer of electric lighting fixtures, has let general contract to Albert M. Higley Co., 2036 East Twenty-second Street, for two-story addition, 70 x 155 ft., for storage and distribution. Cost over \$50,000 with equipment. Wallace W. Leipner, Plymouth Building, is architect.

Libbey-Owens-Ford Glass Co., Nicholas Building, Toledo, Ohio, sheet glass products, has let general contract to A. Bentley & Sons Co., 201 Belmont Street, for modernization and expansion in plant at Rossford, Ohio, to include new unit for plate glass blank production, with batch house, continuous glass furnace andlehr, water-treatment unit and other facilities. Cost over \$750,000 with machinery. Plans also are under way for one-story addition for storage, distribution, electrical and service departments. Mills, Rhines, Bellman & Nordhoff, Inc., 518 Jefferson Avenue, are architects for entire project.

Ohio Public Service Co., Hanna Building, Cleveland, has arranged financing in amount of \$2,000,000, proceeds to be used for expansion and improvements in steam-electric generating plant at Warren, Ohio, including new 37,500-kw. turbine-generator unit and auxiliary equipment.

South Bend Lathe Works, Inc., 423 East Madison Street, South Bend, Ind., plans three-story addition, 40 x 66 ft. Cost over \$40,000 with equipment. Maurer & Maurer, 107 Lincolnway East, are architects.

Indiana National Guard, office of adjutant general, State House, Indianapolis, plans one-story steel hangar, 120 x 150 ft., with repair and reconditioning shop, control tower and other structures at National Guard airport, Stout Field, Mars Hill, near city. Fund of about \$650,000 is being arranged for entire project.

Michigan District

● **Wilson Foundry & Machine Co.**, South Saginaw Street, Pontiac, Mich., plans one-story foundry addition, 80 x 140 ft., and improvements in present plant. Cost over \$125,000 with equipment. L. J. Heenan, Peoples' State Bank Building, is architect and engineer.

Universal Cooler Corp., Melville and Green Streets, Detroit, electric refrigerating equipment, air-conditioning apparatus, etc., has acquired former mill of Susquehanna Silk Mills at Marion, Ohio, consisting of about 13 acres, with main one-story building, about 100,000 sq. ft. of floor space, shops and other structures, and will improve for new plant.

Detroit Wax Paper Co., 1721 West Pleasant Street, River Rouge, Detroit, waxed and other processed paper stocks, has let general contract to C. A. Handeyside Construction Co., General Motors Building, for one-story addition. Cost close to \$55,000 with equipment.

Bay Mfg. Division, Electric Auto-Lite Co., Bay City, Mich., plastic products, plans one-story addition for expansion in tool room and production department. Cost about \$75,000 with machinery. Main offices of parent company are at Toledo, Ohio.

Middle West

● **Bastian-Blessing Co.**, 240 East Ontario Street, Chicago, soda fountains and kindred fixtures, plans new one and multi-story plant in northwestern part of city, where site is being selected. Plans will be prepared soon. Cost close to \$450,000 with equipment.

National Lock Co., 1902 Seventh Street, Rockford, Ill., cabinet hardware, locks, bolts, etc., has let general contract to Security Building Co., 717 East Jefferson Street, for one-story addition, 36 x 135 ft., for storage and distribution.

Collins Radio Co., 2920 First Avenue, N. E., Cedar Rapids, Iowa, plans new one-story plant on local site, 175 x 340 ft. Cost about \$185,000 with equipment.

Public Utility Commission, Owatonna, Minn., asks bids until Sept. 10 for steam-generating unit and auxiliary equipment for municipal power plant. Pillsbury Engineering Co., 1200 Second Avenue South, Minneapolis, Minn., is consulting engineer.

Giddings & Lewis Machine Tool Co., 132 Doty Street, Fond du Lac, Wis., has let general contract to Immel-Mabie Co., 104 South Main Street, for one-story addition, 44 x 120 ft., for expansion in main production division, and for one and two-story L-shaped office and operating building, 140 x 160 ft. Cost over \$85,000 with equipment. F. J. Stepnoski & Son, 104 South Main Street, are architects.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Aug. 19 for cord clamps, clamping rings, strap spring clips, strap slides, strap clip buttons, connecting button washers, cord clamp spacers and other equipment (Circular 28), 40,000 flashlights (Circular 29).

American Flange & Mfg. Co., 825 South Kilpatrick Avenue, Chicago, pipe flanges and kindred engineering products, has let general contract to E. C. Ward, 4720 Arthington Street, for one-story building at 4606 Arthington Street, for storage and distribution. Cost close to \$40,000 with equipment. W. S. Crosby, 6 North Michigan Avenue, is architect.

Village Council, Cashton, Wis., has rejected bids recently received for diesel engine-generating equipment and accessories for installation in municipal power plant, and will take new bids soon.

Allen-Bradley Co., Milwaukee, has obtained permit to build a two-story addition, 90 x 120 ft., to its plant at S. Second Street and W. Greenfield Avenue, costing \$65,000.

Pacific Coast

● **Colan Heating & Sheet Metal Co.**, 1060 Folsom Street, San Francisco, heating and plumbing equipment, sheet metal products, etc., plans one-story addition. Cost about \$45,000 with equipment. Vincent G. Raney, 233 Post Street, is architect.

Vard Mechanical Laboratory, 2961 Colorado Street, Pasadena, Cal., mechanical products, plans new one-story plant, 75 x 120 ft. Cost about \$45,000 with equipment. Herbert A. Hamm, 579 North Holliston Street, is engineer.

Vultee Aircraft, Inc., Downey, Cal., will have plans drawn by Gordon B. Kaufmann, 627 South Carondelet Street, Los Angeles, architect, for several one-story additions, approximating 340,000 sq. ft. of floor space, for expansion in parts production and assembling divisions. This will form part of expansion program now under way at plant, entire project to cost about \$2,500,000 with equipment.

R. N. Chipman Chemical Co., Railroad Avenue and Middlesex Boulevard, Bound Brook, N. J., industrial chemicals, plans addition to branch plant near Portland, Ore., now being completed, for production of sodium chlorate and kindred specialties. Cost over \$100,000 with machinery.

John Bean Mfg. Co., Division of Food Machinery Corp., Julian Street, San Jose, Cal., spraying equipment and kindred products, has asked bids on general contract for one-story addition, 70 x 300 ft. Cost over \$125,000 with equipment. Binder & Curtis, 35 West San Carlos Street, are architects. Main offices are at Lansing, Mich.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 13 for cast iron pipe fittings, valves, meters, etc. (Schedule 2519) for Mare Island Navy Yard.

Air Transport Mfg. Co., Glendale, Cal., E. L. Hollywood, 614 West Colorado Boulevard, president, aircraft and parts, plans one-story plant, 150 x 300 ft., at 3200 Cherry Avenue, Long Beach, Cal., for parts production and assembling. Cost over \$100,000 with equipment.